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[OFFICIAL NOTICE.]

Twentieth Annual Meeting of the American Gas Light Association.

Extract from the Constitution.—"Sec. 12. Application for Active Membership or for Associate Membership, or for transfer from Associate to Active Membership, must be received by the Secretary at least ten days prior to the meeting at which the application is acted on."

General Announcement.

The twentieth annual meeting of the American Gas Light Association will be held in Boston on October 19th, 20th and 21st. The headquarters will be at the Parker House, in School street. The members will be called to order on the morning of Wednesday, Oct. 19th, at 10 o'clock, by the President, Wm. Henry White, Esq.

The following papers are promised:

1. "The Relation of Theory to Practice," by Alex. C. Humphreys, Philadelphia, Pa.
2. "Water Gas Condensation," by John M. Rusby, Jersey City, N.J.
3. "A Gas Association and its Members," by Walter R. Addicks, Boston, Mass.
4. "Saving and Proper Concentration of Ammoniacal Liquor," by George Osius, Detroit, Mich.
5. "Anthracites of the United States," by C. R. Collins.
6. "Some Experiences as to the Best Burner for a Mixture of Coal and Water Gases in about Equal Proportions," by Alfred E. Forstall.

It will be seen that we have but few papers this year, which is owing to the late withdrawal of some of those promised, although much effort has been made to secure others. This leaves plenty of opportunity for developing the possibilities of the question box, and it is hoped that the members will take advantage of it to bring up before the Association the discussion of many valuable points which may not be touched upon by or included in the subjects of the papers.

Members are specially urged to send to the Secretary *in advance* all questions which they would like to hear discussed in the meeting.

The meetings of the Association will be held in Pierce Hall, corner Huntington avenue and Dartmouth street.

The attention of the members is called to the bulletin board, which will be placed in lobby of Parker House. Notices in regard to the meeting, and especially changes in and additions to the printed programme, will be posted thereon, and it will, therefore, be well for the members to consult it from time to time.

As much valuable time is usually lost in calling the roll, and as but an inaccurate list is thus obtained of the members present, it is proposed this year to follow the same method as at the last two meetings, by having the members hand in their names to an attendant as they enter the meeting room for the *first time*. A special blank card has been adopted for this purpose, and these cards with pencils will be handed to members outside the hall door. Members will please write thereon their names and post office addresses.

The Committee of Arrangements is providing for the entertainment of the members during the time that they are not occupied with the business, which is the prime object of the meeting. The pleasure of the ladies will, as usual, be carefully provided for. No full programme has yet been furnished the Secretary, but he is able to announce a banquet to be tendered the members by the local Gas Companies, on the evening of Thursday, the 20th, at the Hotel Vendome.

Members wishing to provide for comfortable hotel accommodations should remember that Boston is full of visitors at the time selected for this meeting, and, therefore, they should engage rooms well in advance. The Parker House and Young's, under the same management, are but a few steps apart, and rooms on the European plan may be secured at from $1.50 to $2.50 (with bath), to $6, and like terms at the Victoria, which is about two blocks from the meeting hall, and several other first-class houses. The Parker House will not be able to accommodate all the members, and, therefore, for the information of those not familiar with Boston, the following hotels, all fairly convenient to the headquarters, are mentioned: The Adams House (European plan, $1 to $5), Hotel

Reynolds (European plan, $1 to $6); Vendome (American plan, $4); Quincy House (American plan, $3 to $5); and the Copley Square and Thorndyke, both on American and European plans. There are many others within convenient distance. The Committee announces that no special rates can be obtained at any of these houses; the regular rates vary, and some of the members may prefer to correspond with a number of these houses before selecting. Each of the houses named will afford thoroughly comfortable accommodations.

The Secretary also announces that the Council will recommend to the Association that Section 41 of the Constitution be amended by adding the following words: "and all parliamentary procedure not specifically covered by this Constitution shall be governed in accordance with 'Roberts' Rules of Order.'"

The Secretary respectfully calls to the attention of those whom it may concern part of Section 52, which reads: "Any member whose dues shall remain unpaid for a term of three years may be dropped from the roll of membership by a vote of the Council."

The Secretary is sorry to find that unless the payments received between now and the time of meeting render it unnecessary, he will be obliged to report to the Council a number of names that he feels sure are only on the list through inadvertence on the part of the members. Dues are payable in advance. If not already attended to, will the members please remit for their dues *before laying this circular aside?*

Transportation.

The following passenger Associations have granted the usual concession in railroad rates, namely:

The Trunk Line Association, composed of the following railroads: Addison & Pennsylvania; Allegheny Valley; Baltimore & Ohio (Parkersburg, Bellaire and Wheeling, and east thereof); Baltimore & Potomac; *Bennington & Rutland; Buffalo, Rochester & Pittsburgh; Camden & Atlantic; Central of New Jersey; *Central Vermont; Chesapeake & Ohio (east of Charleston, W. Va.); Cumberland Valley; Delaware & Hudson Canal Co.; Delaware, Lackawanna & Western; Elmira, Cortland & Northern; Fall Brook Coal Co.; *Fitchburg; Fonda, Johnstown & Gloversville; *Grand Trunk; Lehigh Valley; New York Central & Hudson River; New York, Lake Erie & Western (east of Salamanca, Dunkirk and Buffalo); New York, Ontario & Western; New York, Philadelphia & Norfolk; Northern Central; Pennsylvania; Philadelphia & Erie; Philadelphia & Reading; Philadelphia, Wilmington & Baltimore; Rome, Watertown & Ogdensburg; Western New York & Pennsylvania; West Jersey; West Shore; Wilmington & Northern.

The New York and Boston lines, between the two places named, viz.: Boston & Albany Railroad; Fitchburg Railroad; New York & New England Railroad; New York, New Haven & Hartford Railroad; New York, Providence & Boston Railroad; Old Colony Railroad; Fall River Line; Norwich Line; Providence Line; Stonington Line.

The Central Traffic Association, covering the following ground: Bounded on the east by Pittsburgh, Salamanca, Buffalo, and Toronto; on the north by the line of and including points on the Grand Trunk Railway, from Toronto to Port Huron; thence via Lakes Huron and Michigan to the north line of Cook County, Illinois; on the west by the west line of Cook County and the Illinois and Mississippi rivers, to Cairo, including Burlington, Keokuk, Quincy, Hannibal and St. Louis; and on the south by the Ohio river, but including points on either side of that river.

The Western Passenger Association, covering territory west of Chicago and St. Louis, *declines* to grant any concession on account of the probable limited attendance from this territory. Members interested are referred to the fifth rule below, under which they can secure special rates from Chicago and St. Louis.

The Southern Passenger Association, composed of the following companies: Atlantic Coast; Atlanta & West Point; Brunswick & Western; Charleston & Savannah; Central Railroad of Georgia; Georgia Railroad; Georgia Pacific; Norfolk & Western; Pennsylvania Railroad (lines south of Washington); Port Royal & Augusta; Raleigh & Gaston; Richmond & Danville; Richmond, Fredericks & Potomac; Savannah, Florida & Western; Seaboard & Roanoke; Shenandoah Valley (lines south of Potomac river); South Carolina Railway; Western & Atlantic Railroad.

The usual concession in railroad rates has been granted, namely, one-third off on the round trip. That is, members will pay full fare going, obtain a certificate from the ticket agent from whom they purchase their tickets, and, upon presentation of this certificate at Boston, duly endorsed by the Secretary, they can obtain the return ticket at one third the full fare rate. To illustrate: Suppose the regular fare from some point to Boston to be $30. At the time of purchasing his ticket to New York the member pays $30 and obtains the necessary certificate from the agent; he has that indorsed by the Secretary, at Boston; then, on presentation of the same to the ticket agent at Boston, he can procure a return ticket by payment of only $10.

The following extracts from the regulations of the railroads are cited for the information of the members. The special rates are granted subject to these regulations:

1st. The American Gas Light Association is obliged to guarantee to redeem at full fare rates any return tickets procured by persons in attendance at meeting which may afterwards be found in the hands of "scalpers."

2nd. The reduction is conditional on there being an attendance at the meeting of not less than 100 persons holding certificates.

3d. Each person, to obtain the excursion rate, must purchase a first-class ticket (either limited or unlimited) to the place of meeting, for which he will pay regular fare, and upon request, the ticket agent will issue a printed certificate of purchase of the standard form. Agents at all important stations are supplied with certificates.

4th. If through tickets cannot be procured at the starting point, purchase short-trip ticket to the most convenient point where such through tickets can be obtained, and there purchase through to place of meeting, requesting a certificate from the ticket agent at the point where second purchase is made.

5th. Tickets for the return journey will be sold by the ticket agents at the place of meeting at one-third the highest limited fare, only to those holding certificates signed by the ticket agent at point where through ticket to place of meeting was purchased, and countersigned by signature written in ink by the Secretary of the Association, certifying that the holder has been in regular attendance at the meeting.

6th. No reduction of fare will be made on the return passage if the going ticket is purchased more than three days before the opening date of the meeting; except that when meetings are held at distant points to which the authorized limit is greater than three days, tickets may be purchased before the meeting in accordance with the limits shown in regular tariffs.

7th. Certificates are not transferable, and return tickets secured upon certificates are not transferable.

8th. The certificate of agent at starting point, duly endorsed by the Secretary of Association, must be presented to ticket agent at the place of meeting, within three days (Sunday excepted) after adjournment of meeting. The return ticket will be for the line or lines covered by the going ticket.

9th. No refund of fare will be made on account of any person failing to obtain a certificate.

Important.—Be sure to obtain your railroad certificate when buying your ticket for Boston. Apply for ticket and certificate at least 30 minutes before train time. A separate certificate is necessary for each individual obtaining the reduced rate. Be sure to have the Secretary indorse your certificate at Boston. Apply for return ticket at least 30 minutes before train time, and have your certificate with you. Members will please hand their certificates to the Secretary, or his clerk, upon arrival at the place of meeting. If there are 100 members present, holding certificates, each certificate will then be properly indorsed and handed back to owner, before adjournment. Keep this circular in your pocket, and apply to it if you are in doubt.

Section 51. "No member who owes two years' dues shall be entitled to vote, or to participate in the deliberations of the Association, or to receive a copy of the proceedings."

This provision of the Constitution will be enforced at the coming meeting.

ALPHEUS B. SLATER, JR., Secretary.

PROVIDENCE, R. I., Sept. 12, 1892.

* Only for business originating at, or destined to, stations on the direct lines of these roads between Troy, N. Y., and Montreal, Canada.

Lighting and Air Contaminations.

[Communicated by Dr. Ferd. Fischer to the German Applied Chemistry Association. Abridged from the German for the English *Gas World*.]

The author has been investigating these matters for the last eight years. Herr E. Cramer has recently challenged his observations and calculations, on the alleged ground that materials used for lighting are never completely burned, but that there are always formed smoke and products of incomplete oxidation. He let a candle burn for from three to six hours in an air calorimeter, and estimated the quantity of heat liberated from the pressure of the air contained between the double walls of the apparatus. He thus found the heat evolved to be 8,846 to 9,659 heat units (quantity of heat required to raise 1 lb. of water through 1° C.) per lb.; the mean of his values he calls "natural combustion heat." With tallow and paraffine candles he made only four experiments: Rock oil was burned in a small lamp of only 1 candle power; coal gas in a small bunsen with closed air holes, so that the flame was one or two candles bright. In this way he obtained the following values: Stearin candles, 8,846 to 9,659; tallow candles, 8,686 to 8,844; paraffine candles, 10,381 to 10,981; rock oil, 10,440 to 11,535 units, all per lb., and gas, 431 to 472 per cubic foot. But the data obtained by purely calorimetric methods are from 6 to 11 per cent. in advance of these. In the air drawn through, the carbonic acid and water vapor were determined, and any difference between the results and the quantities calculated from the elementary analysis was set down as due to incomplete combustion. The apparent loss of carbon was, in coal gas, 2.41 per cent.; in tallow, 1.35; in stearin, 4.85; in paraffine, 2.14, and in rock oil, 12.47 per cent.; while the ap

parent loss of hydrogen was, in tallow, 8.47; in stearin, 8.87; in paraffine, 11.18; in rock oil, 12.32, and in gas, 19.14 per cent. Cramer concluded that he had, for the first time, determined the actual heating power of and the amount of contamination of air by illuminants. It is not clear from his descriptions what degree of reliance can be placed upon his calorimeter. But the limits of variation, which in the case of stearin and paraffine exceed 10 per cent., are far too wide for accurate work; and his data are not consistent with one another. For example, paraffine loses 11.5 per cent. of heat, 2.14 per cent. of carbon, and 11.18 of hydrogen, while stearin loses 6 per cent. of heat, 4.85 per cent. of carbon, and 8.87 per cent. of hydrogen; which cannot be correct. In Cramer's method the air surrounding the flame ought to be frightfully impure, if the combustion be as he concludes it to be. During the rock oil experiment there should be a separation of 385 grains of carbon and 60 of hydrogen, which would have rendered themselves manifest in some way. Cramer's candles were so burned that the air drawn off contained 3 per cent. of carbonic acid. His gas was burned through a bunsen burner, and his petroleum was burned so as to give a flame only one candle bright. These conditions were quite abnormal, and if he had calculated up to 100 candle hours as his standard, he would have been astonished at his own results.

Nowadays, since inverted gas lamps have become familiar, 100 candle hours is a suitable standard. For due lighting of a writing table the brightness ought to be 50 meter candles (= 40½ candles at a yard distance) and should not be less than 10. A petroleum lamp of 25 candles gives this full illumination at a distance of 28 inches, while the lower limit is reached when the lamp is at a distance of 64 inches. Smaller lamps must be brought nearer, and are, accordingly, uncomfortably warm. Owing to the unequal distribution of light by inverted lamps, and to the rapid diminution of illumination with increasing distance, it turns out that a table 160 inches long may actually be better lit by two lamps each of 25-candle power than it would be by a 222 candle burner 160 inches above it; and, besides, the dark roof is disagreeable in apartments for entertainment. Twenty-five paraffine candles may make a more festive impression than a 250 candle power inverted lamp. The colors of the walls and furniture are also elements to be considered in appreciating the relative costs of, and contaminations by, different illuminants.

The following table gives certain data, all reduced to 100 candle-hours as the standard:

Illuminant.	Quantity. Used.	Cost. (Pence).	CO_2 Produced. (Cu. Ft.)	H_2O Produced. (Lbs.)	Heat Units Evolved. (Lb.—Cent.)
Tallow candles.....	2.20 lbs.	16.8	51.62	2.31	19,360
Stearin "	2.02 "	15.6	39.69	2.29	17,820
Paraffine "	1.70 "	14.4	43.12	2.18	17,556
Wax "	1.70 "	36.0	39.69	1.94	16,610
Colza oil, Carcel lamp (= 10 c).....	0.95 "	4.92	21.54	1.14	8,316
Colza oil, student's lamp (=4 c).....	1.54 "	5.84	35.32	1.87	13,552
Petroleum, small flat (= 4 c)	1.32 "	1.44	33.55	1.76	13,728
Petroleum, large round (= 25 c)...	0.66 "	0.72	16.77	0.88	6,864
Gas, slit burner (= 10 c.).	53.00 c. ft.	3.60	30.49	3.54	17,490
Gas, argand (= 20 c.) ...	35.30 "	2.40	20.32	2.36	11,660
Siemens regenerative (= 136 c).....	17.65 "	1.20	10.16	1.18	5,830
Siemens inverted (= 70 c.)	15.54 "	1.08	9.14	1.06	5,247
Siemens inverted (=222 c.)	11.65 "	0.84	7.11	0.83	4,081
Siemens flat flames (= 169 c.).....	10.95 "	0.72	6.09	0.71	3,500
Wenham (= 144 c.).....	13.42 "	0.96	8.13	0.94	4,664

It is to be remarked that in the ordinary use of petroleum lamps of 25-candle power, more than 0.66 lb. is used for 100 candle-hours, because people so generally turn down the flame somewhat. There is great loss of light, but a relatively small economy in oil; and the combustion is less perfect, since the excess of air which passes the flame cools it down. A lamp properly constructed, trimmed and lit, gives, however, in point of fact, next to no trace of products of imperfect combustion, and certainly nothing like the large quantities, 150 grains per hour, inferred by Cramer.

Electric light is variable in cost, but from a large station glow lights cost generally about 3.6d. per 100 candle-hours, which is much dearer than petroleum lamps; it does not vitiate the air and throws out very little heat, but the excessive brilliancy of the filament is bad for the eyes.

[Communicated Article.]

The Wilkinson Water Gas Plant at the Works of the Milwaukee (Wis.) Gas Light Company.

For a long time your correspondent has intended to give you a description of the water gas plant of the Wilkinson process type erected for the Milwaukee Gas Light Company, of Milwaukee, Wis., during the season of 1890.

This plant was erected by the well-known firm of Bartlett, Hayward & Co., of Baltimore; the arrangement of the apparatus and machinery being designed jointly by their Engineer, Mr. Fred. Mayer and by Mr. Cowdery, Superintendent of the Milwaukee Gas Light Company.

As such plant has some novelties in construction, which constitute a departure from customary methods, a description will doubtless prove useful to the fraternity.

On appealing to Superintendent Cowdery for such aid as he could give, he produced a cut (see illustration) showing an interior view, lengthwise through the building, which will help in giving a correct impression. The plant consists of a building of four rooms. The generator room (or main building) contains two 200-horse power Hazelton boilers; 2 cupolas, of a capacity each of 500,000 cubic feet of hydrogen daily; 3 Kloenne-Bredel through benches of sixes, with retorts 16 in. by 26 in. by 20 ft.; 2 illuminators, or vaporizers, each of a capacity for vaporizing naphtha sufficient for 1,000,000 cubic feet of gas daily; 1 scrubber for scrubbing the hydrogen; and the storage bins, which have a capacity for storing a 24-hour supply of fuel for the various purposes.

Adjoining the end of the main building or generator room is the engine room, containing exhausters, blowers, conveyer engines, stoker engines and naphtha pumps; each piece of apparatus being duplicated, virtually giving the plant 2,000,000 cubic feet daily capacity, so far as machinery is concerned.

Adjoining one end of the engine room, in the shape of a wing thrown out from the side of the main building, is the meter room (not shown in the illustration), in which is the meter for measuring the hydrogen used in making the commercial water gas.

Over the meter room, situated in a tower, is the Hambleton naphtha meter, connected to the hydrogen meter in such a manner that each revolution of the hydrogen meter will make a certain number of revolutions of the naphtha meter, sufficient to supply the amount of naphtha required in each 1,000 cubic feet of gas. This is adjustable by means of movable gears, so that the amount of naphtha used shall be what is required—anywhere between 3½ and 5 gallons per 1,000 cubic feet. The dials of the meters indicate the amount of hydrogen used, as well as the number of gallons of naphtha used, to produce commercial gas.

Adjoining the other end of the engine room, and opposite the main building, is the condensing room (also not shown in the illustration), in which are the condensers for cooling commercial gas.

In front of the engine room, in line with the main building, are the scales, filling hopper, ash bins, etc., used in connection with the conveyer for handling the fuel used in the plant (all of which is shown in the illustration.)

In the arrangement of the conveyer, ash bins, storage bins and feeding spouts to the cupolas, benches and boilers, lies the novelty of the plant. The illustration shows the arrangement so perfectly that a description in great detail is hardly necessary.

It will be noticed that the driving machinery for the conveyer is located on top of the storage bins, in such a position that the load is lifted, not pushed. The conveyer will carry ashes and dump them into the ash bins at the same time it is carrying in fuel to the storage bins, without the one interfering with the other.

The machinery works almost noiselessly and with little power, it being possible to operate the entire conveyer, when it has no load, with one man. The only power necessary, therefore, is the lifting of the amount of coal in the buckets on the vertical rise at the end wall of the main building.

This machinery is of the type known as the McCaslyn conveyer, and was built and put in by the C. W. Hunt Company, of New York.

The illustration shows the feeding spouts to the various furnaces from the storage bins, each spout being supplied with a valve, that the required amount only of fuel may be conveniently drawn at pleasure.

The water gas plant is fitted with all the convenient appliances which especially belong to the Wilkinson apparatus, and which are characteristic of the builders, Messrs. Bartlett, Hayward & Co., in all their work. An explosion valve on the blast pipe has already proved useful in case of an explosion, giving vent to the force of the explosion and requiring only one-half hour's interruption to the operation of the cupolas.

The boilers are provided, each, with two Brightman stokers, so that the feeding of the boilers with fuel is automatically done. Each boiler is, also, supplied with a Worthington meter (especially made for the purpose) which measures the feed water supplied to the boiler. Steam pressure of 130 lbs. is carried on the boiler, as it has been found that steam at that high pressure will produce so much better results than with lower pressure. It is probably due to this fact that the plant is enabled to handle a 58° to 60° naphtha to as good advantage as that of a lighter gravity. This gravity of naphtha is entirely evaporated in the illuminators, and produces as much gas and of as good a quality as the lighter products. The only noticeable difference in its use appears to be that it requires a small fractional part more coal in the benches for fixing the oil gas, and that the benches are not capable of making as much commercial gas per retort per day as when the lighter gravity of naphtha is used.

The results obtained are reported as follows: To produce 1,000 feet of commercial gas is required—

Cupola fuel (anthracite coal).....	30 lbs.
Naphtha.....	4½ gals.
Bench fuel, for fixing oil gas.....	9¾ lbs. gas coke.
Steam fuel (¾ coal dust and ¼ coke dust)	14 lbs.

Evaporated in the boilers, water measured at 212° temperature, 105 lbs., equal to 7.5 lbs. per pound of combustible. Commercial gas made per retort (58° and 60° naphtha), 125,000 cubic feet. Commercial gas made per retort (68° naphtha), 140,000 cubic feet.

The above material makes a gas in this plant of 30-candle power. Mr. Cowdery states in explanation that the plant is not arranged at present to purify the gas from carbonic acid, and that there is usually produced about 3½ per cent. of that impurity. With the carbonic acid removed he believes the gas would test considerably above 30-candle power.

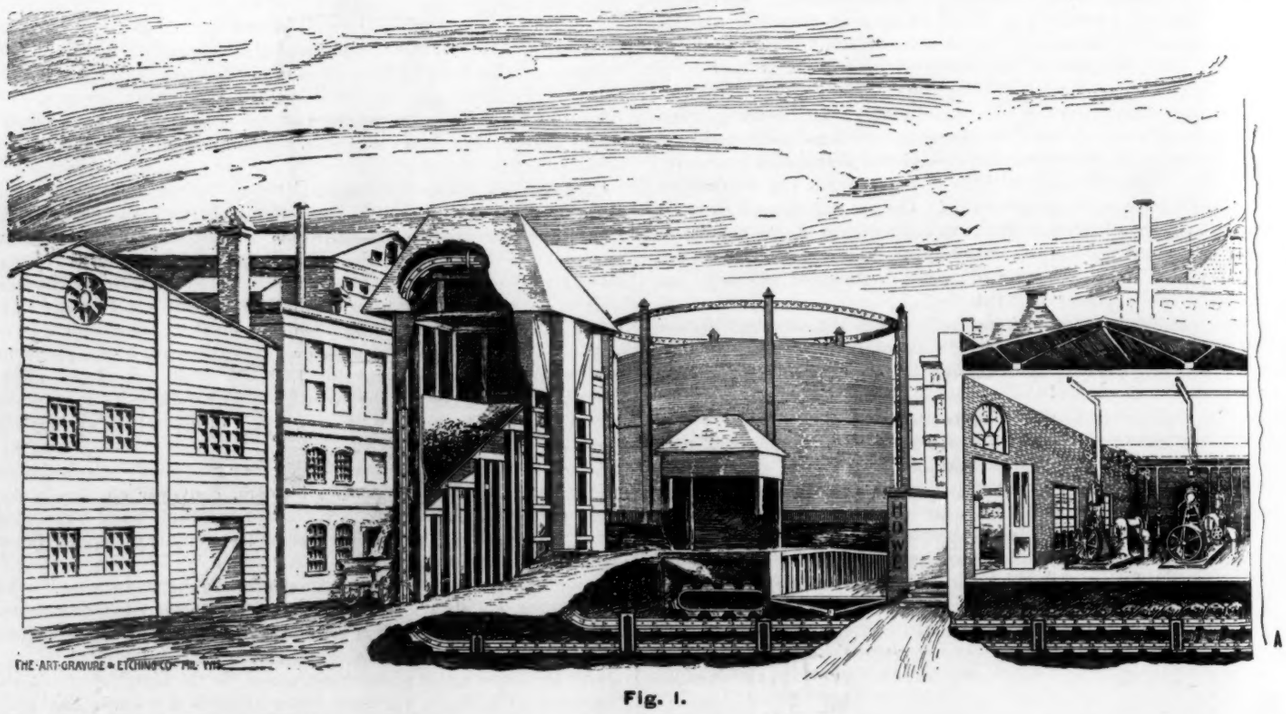

Fig. 1.

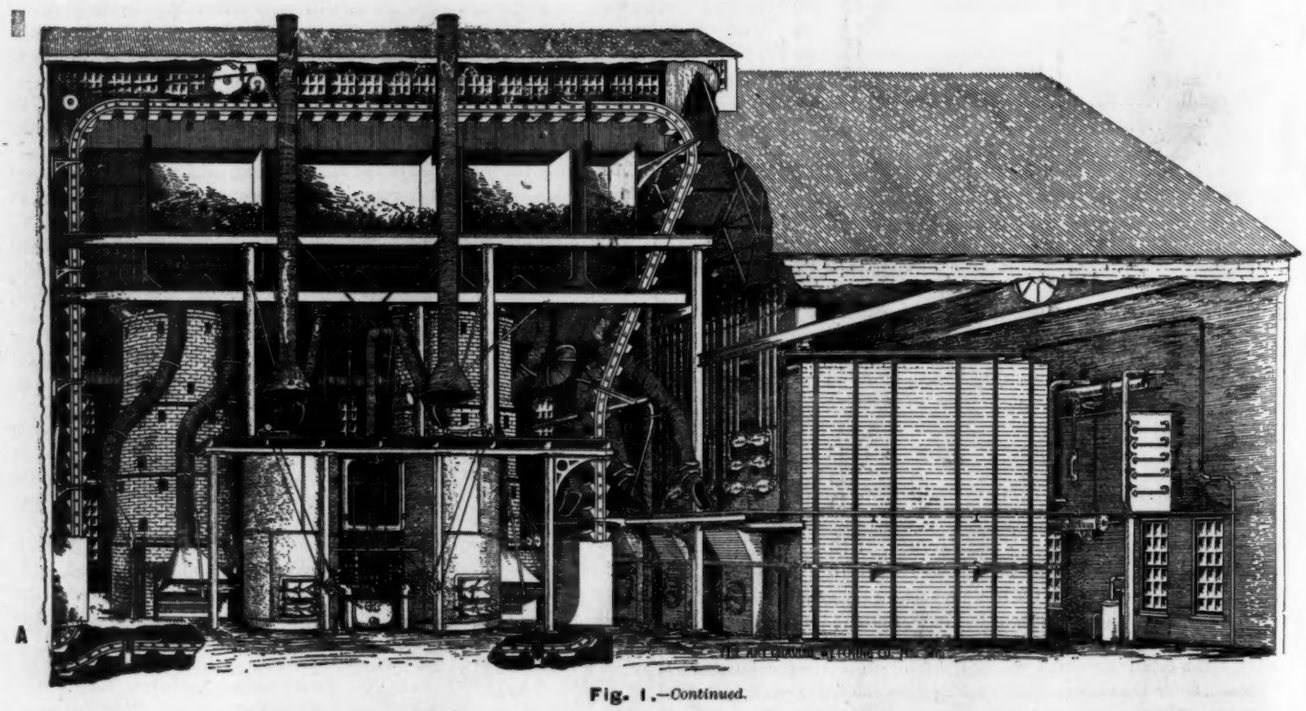

Fig. 1.—*Continued.*

Scharfe's Purifier and Condenser.

On the 6th inst. U. S. Letters Patent (No. 482,141) were granted to Gottlieb Scharfe, of Annapolis, Md., for an improvement in gas purifiers and condensers. The inventor describes the devices in the following manner:

My invention relates to an improvement in gas purifiers and condensers, and it has for its object to provide an apparatus that will thoroughly cleanse the gas as it comes from the retorts or generators, and will effectively separate by condensation tar and other heavy hydrocarbons with which the gas is impregnated and is desired to be separated from, allowing the lighter gases to pass on through the purifier and be submitted to a succession of purifying and condensing steps, which cause the purification and condensation to be complete; and the same consists of a succession of cooling chambers provided with cooling and condensing means, to which the gas has a circuitous passage and which are provided with special details of construction and arranged in the novel combination, as will be hereinafter more fully described, illustrated in the accompanying drawings and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is front elevation and a sectional view on the line 1 1 of Fig. 2 of a gas purifier and condenser constructed in accordance with my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical longitudinal sectional view of the complete apparatus. Fig. 4 is a sectional view on the line 2 2 of Fig. 3. Fig. 5 is a top plan view of the apparatus. Fig. 6 is a horizontal section on the line 3 3 of Fig. 1. Fig. 7 is a similar view on the line 4 4 of Fig. 1. Fig. 8 is a similar view on the line 5 5 of Fig. 1. Fig. 9 is a detail in perspective of one of the purifier sectors.

Referring to the accompanying drawings, 1 designates a suitable foundation or bed, upon which is suitably mounted the vertical cylinder 2, which is preferably constructed in the sections 3 in order that access may be easily gained thereto for the purposes of cleaning as well as removal. Within this cylinder or chamber is a second smaller cylinder or chamber

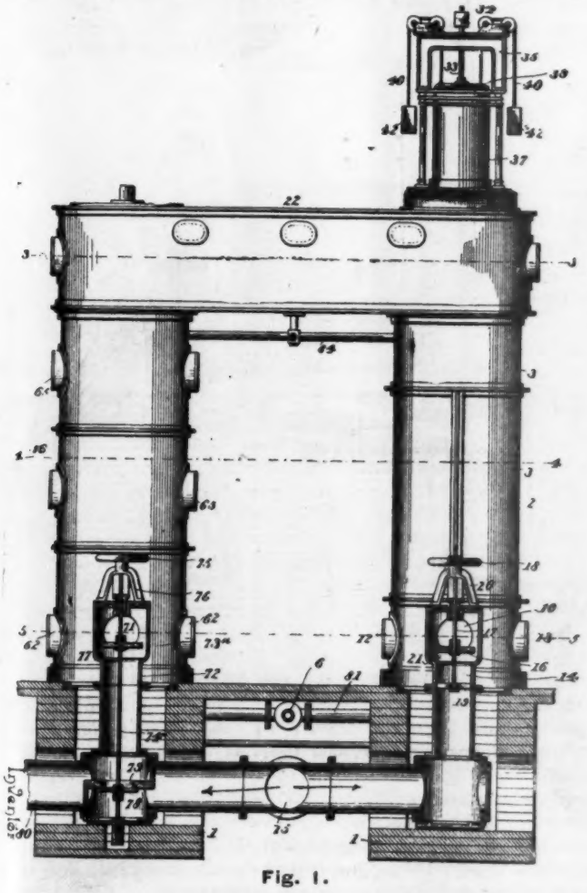

Fig. 1.

4, around which and within the space inclosed between said chamber and the outer cylinder there is a free circulation of water, which is admitted from the water supply pipe 5, connected thereto at the bottom by the connection 6 and at the top by the connection 7, thus providing a free circulation of water through the inclosed space and around the inner cylinder or chamber. The inner cylinder or chamber 4 is provided through its entire length with a series of horizontal circulating pipes 8, which are placed at right angles to each other and form a network of cooling pipes, through which the gas in its upward passage permeates and is cooled and condensed and relieved of the undesirable substances, the right angularly disposed circulation pipes being in communication

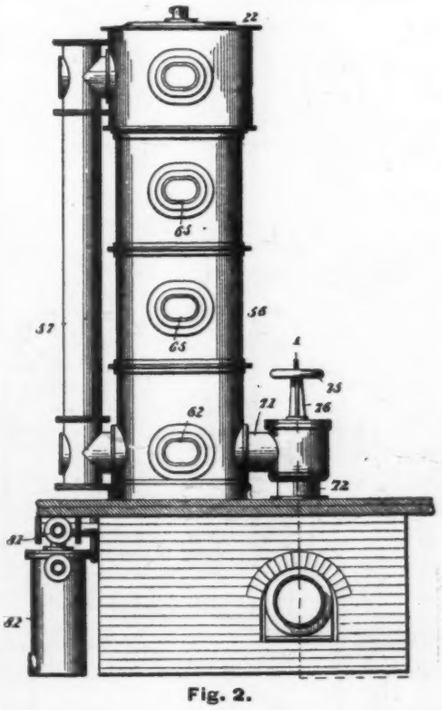

Fig. 2.

with the inclosed water space. Between the bottom tier of circulation pipes 8 and the bottom of the inner chamber is left a space or box 9, into which the supply of gas is admitted through the pipe 10, while the tar, heavy hydrocarbons and water of condensation escape from said box through the drain pipe 11, communicating with the bottom thereof. A manhole 12 also communicates from the outside of the main cooling cylinder or chamber with said space, located in the bottom of said inner cylinder, in order that access may be gained thereto for the purposes of manual cleaning and inspection. For the same purposes the main cylinder 2 is provided with the manhole 13. The gas is admitted to this inner cooling chamber through the supply pipe 10, which is in communication with the main supply pipe 14, which passes beneath the foundation or bed upon which the main cylinder is mounted, and connects with the retort or generator pipe 15, which conducts the gas manufactured therein to the purifying apparatus.

Located within the vertical section of the supply pipe and at its joint with the pipe 10, communicating with the interior of the inner cooling chamber, is the valve 16, mounted upon the stem 17, and is operated by the hand wheel 18, working thereon, said stem being supported within the supply pipe by the cross brace 19 and the bracket 20, located at the upper terminal of the same and without the pipe, the valve referred to being adapted to seat itself upon the shoulder 21, located directly beneath the opening in the connection 10 with the main supply pipe 14.

Directly upon the cylinders 2 and 4 and horizontally thereover is the supplemental purifying chamber 22, into which the gas is conducted from the first cooling chamber 4, through the pipe 23, communicating with the upper end of said cooling cylinder and the interior of the supplemental chamber 22. The chamber 22 is partitioned off by the partition 24 and forms a purifying space 25, directly around the communicating pipe 23, said space being designed to be filled with water. Within this space and directly over said supply pipe 23, and inclosing the same, is a cover 26, which regulates the amount of gas supplied to the interior of chamber 22, and also materially assists in the purification and condensation. Said cover consists of a top cap 27, extending horizontally across the mouth of supply pipe 23, and is provided with a series of depending circular plates 28, surrounding and inclosing the supply pipe 23. Each of plates 28, which are preferably three in number, is provided with a series of gas escape openings 29, which do not register with

each other and which cause the gas in passing therethrough in its escape through the water within the chamber 25 to pass around and within the said plates to find its egress through said holes, and thus is additionally subjected to purification by said water. Communicating with the spaces inclosed by plates 26 is a series of perforations 30, located around near the top edge of the cap 27, which permits the water which is supplied from above, which will be described, to pass through the same and within the plates, thus filling the spaces between the plates with water and cooling the same, and consequently the gas, before it can find its escape therethrough. Said plates are kept off from the supply pipe 23 by means of the small guide rollers 31, secured within the brackets 32, located near the bottom edge of the inner inclosing plate, and thus guides and facilitates the movement of the cover 26 as it rises and falls, according to the pressure of gas, and thus regulates the amount supplied within the chambers 22 and 25.

exerted upon the cover 26 by the gas in its escape from the cooling chamber 4. Water is admitted to the spaces inclosed by the walls 37 and 38 of said regulator through the pipe 43, communicating with the main water supply pipe 5, and when the water has filled the inclosing space it overruns the inner wall 38, which is somewhat shorter than the outer wall 37, and falls down and fills up the space 25 around the supply pipe 23, communicating therewith, and in its passage falls directly upon the cap 27 of the inclosing cover 26, thus cooling the same, and also passes through the holes located therein and communicating with the spaces inclosed between the plates 28, thus keeping all the parts with which the gas comes in contact in a cool condition. After the gas has escaped through the perforations in the series of plates 29 in a quantity regulated according to its pressure it passes through the passage 44, directly above the partition 24, into the opposite cooling chamber 45 of the main chamber 22.

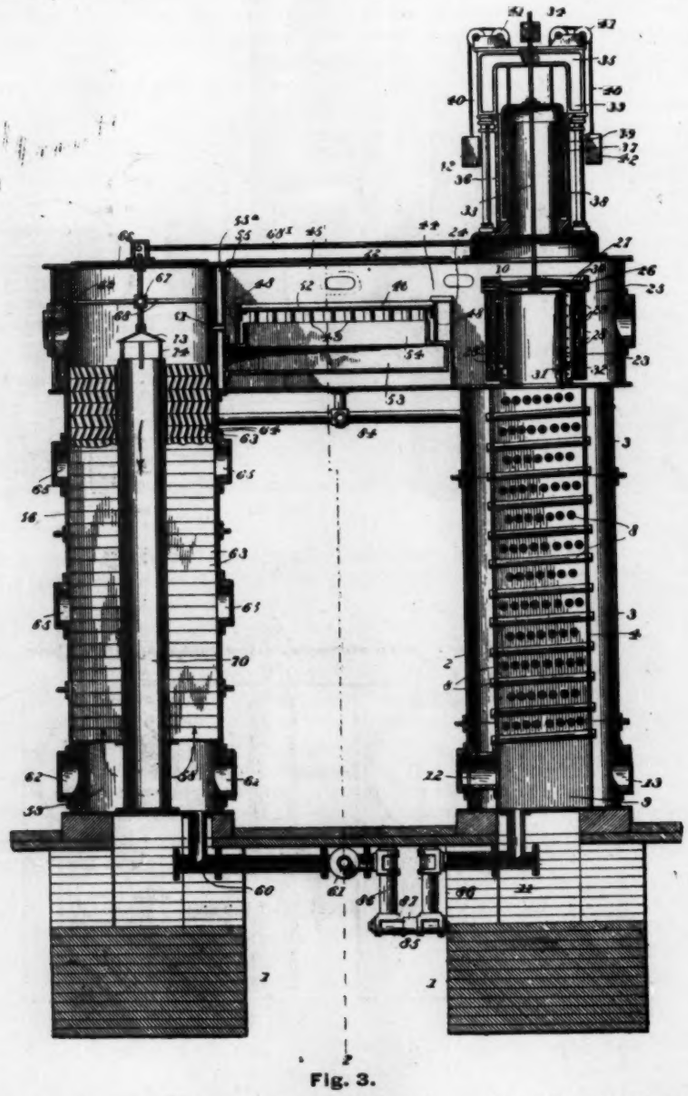

Fig. 3.

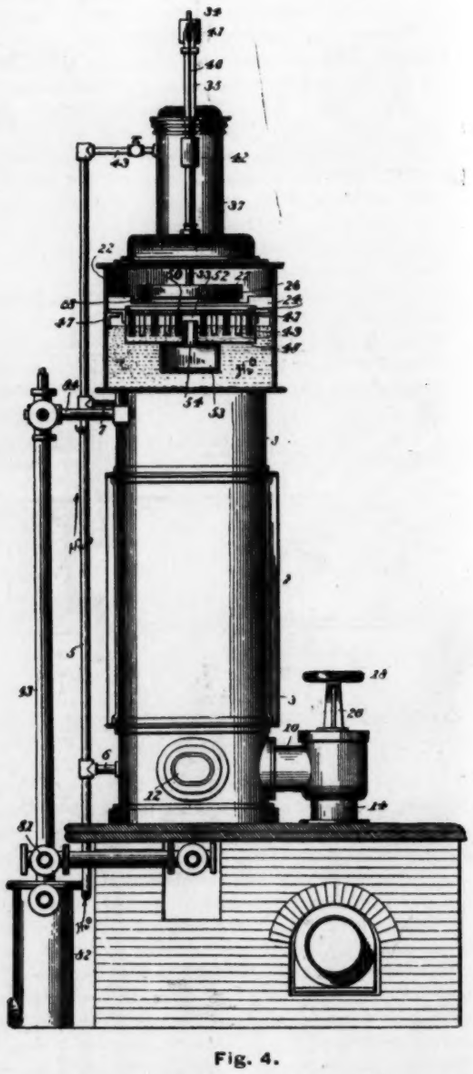

Fig. 4.

The cap 27 of the inclosing cover 26 is connected by means of the rod 33 to the regulator 34, mounted on the outside and top of chamber 22. The upper end of said rod works through and is supported within the top of the bracket 35, upon which is mounted the regulating devices, and within said frame or bracket 35 is mounted the upright cylinder 36, which is provided with the outer and inner walls 37 and 38, inclosing a space within which works the inverted cylinder 39, which is rigidly secured to the shaft 33 and within the frame 35. Ropes or chains 40 are connected to the top of said inverted cylinder and pass over the pulleys 41, located on the top of the frame 35, and are provided at their lower ends with the weights 42, which, together with the weight of the inverted cylinder and the stem upon which it is mounted, equally balances the weight of the cover 26, inclosing the supply pipe 23, and thus exactly counterbalances the same and regulates the amount of gas introduced within the cylinder 22, according to the amount of pressure

Located within the chamber 45 is a pan 46, supported upon the side brackets 47 and provided with the depending sides 48 and with a series of depending tubes 49, communicating with the slotted perforations 50 in the face of the pan or plate, said tubes being somewhat shorter in length than the sides of said pan, the chamber 45 being designed to be filled with water by the overflow from the chamber 25 up to the point of its overflow outlet 51, thus having the water at a height that covers the lower ends of said depending tubes 49, and causing the gas in seeking an escape to pass through said perforations and depending tubes and bubble through the water surrounding the same and collect within the space 52, beneath the top of said plate, and inclosed by the depending sides of the same, which are of greater length than said depending tubes.

Directly beneath the plate 46 is a supplemental gas conducting chamber 53, upon the top of which the depending sides of the plate are de-

signed to rest and additionally support the same. Chamber 53 is provided with an elongated ingress tube 54, situated centrally along the top side of the same and projecting up within the space 52 beneath said perforated and tubed plate, thus providing an escape for the gas from this point, which, passing through said elongated tube, escapes into the chamber 53, which communicates with the space 55a, inclosed by the

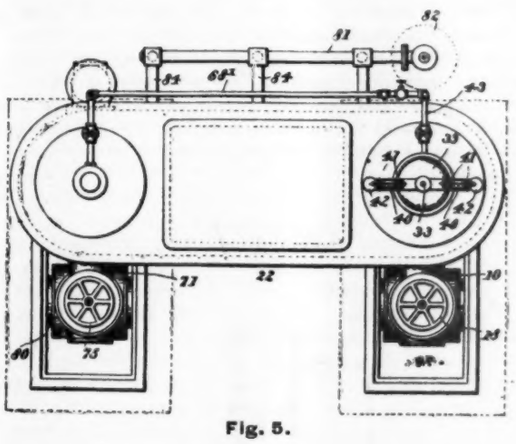

Fig. 5.

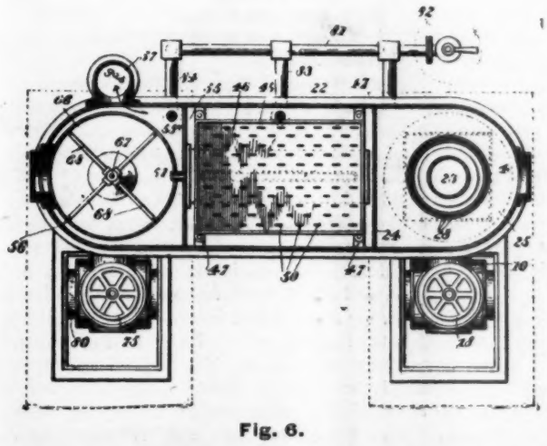

Fig. 6.

jacket 55, with which the upper end of the second upright purifying cylinder 56 is provided, said jacket extending, as said, only around the upper end of cylinder 56, and communicates with the gas conducting pipe 57, which, passing downward the full length of the cylinder, communicates again with the same at its lower edge through the opening 58, which communicates with the bottom space or box 59, corresponding somewhat to the space 9 in the first cooling chamber. The drain pipe 60 communicates with the interior of said space or box and communicates with the common drain pipe 61, with which the pipe 11, communicating with the space or box 9, is in communication, and thus provides an escape for foreign matter, while access is had to the interior of said space through the manholes 62, located in the sides of the cylinder 56. The gas upon entering said space or box 59 begins an upward ascent through a series of purifying sectors 63, which are placed entirely around and within the cylinder 56, leaving in the center a circular space for the purposes as will be directly described. Sectors 63 are suitably bolted together within the chamber 56 and are provided with a series of diagonal plates 64, which are parallel with each other, and the opening on both faces of said sectors registering exactly and being in communication with the corresponding openings in each successive sector, while the plates in each sector are not in a direct line with each other or diagonal in one direction, but are alternately arranged, so that when the same are placed upon each other, a zigzag course is provided for the gas through the various channels of the sectors, access being had to the same for the purpose of cleaning, removal, or placing within by means of a series of manholes 65, located in the sides of said cylinder 56.

Above the top tier of sectors the cylinder 56 is provided with a space 66, within which is located a revolving sprinkler 67, which is provided with a series of horizontal arms 68, having lateral end openings 69, through which the water escapes and causes the said sprinkler to revolve and throw the water against the sides of the space 66 and within the whole upper end of said cylinder, thus causing the water to trickle down through the diagonally arranged sector plates 64, and thus thrown in direct contact with the ascending gas, which is further relieved of impurities, which are carried by the water to the bottom of said cylinder, from which it escapes through the drain pipe 60. Water is supplied to the sprinkler 67 through the pipe 68x, in connection with the main water supply pipe 5.

Centrally located within the cylinder 56 is the gas conducting tube 70, which extends down through the circular opening left by the circularly arranged sectors, and is designed to conduct the gas after having passed up through the sectors down to the escape pipe 71, communicating with the bottom thereof, and passing through the cylinder 56 and connecting with the main outlet pipe 72. Secured to the upper end of tube 70 within the cylinder 56 is a deflecting plate 73, mounted and supported by suitable brackets 74, and acts both as a shield to deflect the water and keep the same from the tube 70, and furnishes a bearing for the end of the sprinkling tubes 67.

The main outlet pipe 72, at its connection with the pipe 71, communi-

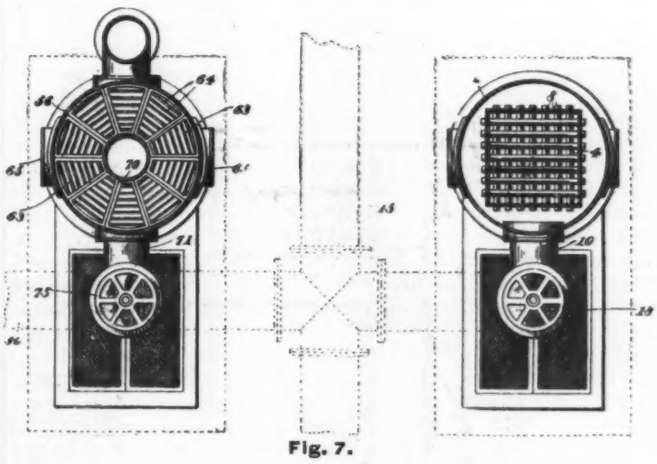

Fig. 7.

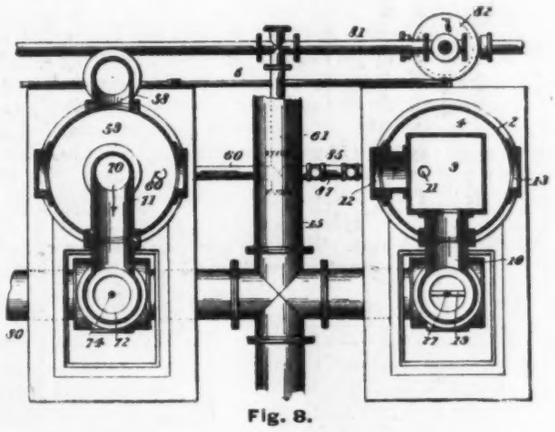

Fig. 8.

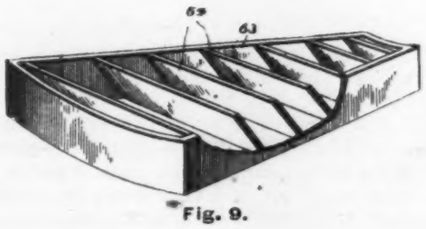

Fig. 9.

cating with the gas conducting pipe 70, is provided with a valve 73a, which is mounted upon the stem 74a, extending up through the upper end of said pipe, and is operated by the hand wheel 75, working on the upper end thereof, which extends and is supported in the bracket 76, corresponding with the bracket 20, located in the top of the supply pipe 14, said valve being designed to seat itself upon the shoulder or seat 77,

located within the outlet tube directly beneath its connection with the tube 71. The lower extremity of said valve stem 74a is provided with a supplemental valve 78, that is designed to be seated against the valve seat and partition 79, located at the lower end of pipe 72, and controls the direction of the gas through and to the main outlet pipe 80, which conducts the gas to the desired point for utilization. The object of these double valves on the same valve stem is to permit the gas to pass directly from the supply pipe 15 from the retort or generator through the main outlet pipe or passage 80 without passing through the purifying cylinders or chambers, the valves controlling the openings communicating directly with said chambers being, of course, closed, while the valve 78 would be thrown open, and thus allow a free and uninterrupted passage of the gas to the source of use.

The drain pipes 60 and 11 communicate with the bottom of the purifying cylinders 4 and 56, and conduct the foreign matter and water of condensation through the same to the main drain pipe 81, which is in communication with the drain collecting cylinder 82, pipes 83 and 84 also placing the same in communication with the bottom of chamber 45, which can also be drained, as desired, the overflow of water in said chamber 45 through the outlet 51, previously referred to, being utilized by passing through into the chamber 66, located in the top of the cylinder 56, and trickling down through the sectors therein.

The operation of this apparatus is thought to be apparent from the foregoing description. The gas entering from the retort or generator into the cylinder 4 is subjected to its first stage of purification, and passes up through this cooling cylinder and through the network of right angularly arranged circulating pipes therein. Leaving this cylinder, it passes up and under a continuously cooled cover inclosing the outlet of this cylinder, and, according to the amount of pressure, the same escapes through alternately arranged perforations in the sides of this cover, which is evenly balanced with an ordinary regulator. Passing over the water in this chamber, the gas next strikes a perforated plan or plate provided with extended tubes depending beneath the water. Bubbling through the water after leaving these tubes, the gas finds its escape through a conducting chamber located beneath this tubed pan or plate, and finds escape around the top of the second cooling chamber through an inclosed space and down through a conducting pipe that communicates with the lower end of said chamber. The gas now passes up through a series of sectors arranged the full length of the cylinder, and down which trickles a stream of water supplied by a rotating sprinkler and the overflow from the top purifying chamber, finally escaping downwardly through a tube running the length of the second cooling chamber, and passes out through the main outlet pipe.

Inasmuch as the drain pipes 60 and 11 of the two purifying cylinders communicating with each other and a common drain center 61 are directly in communication with each other, to avoid the possibility of the impure gas which enters the first cylinder or purifying chamber from entering the second cylinder 56 under the impulse of pressure before the same has been subjected to purification, I provide the drain pipe 11 intermediate of its joint with the horizontal portion connecting with the common drain 61 with the hydraulic closer or cut-off 85, which effectually obviates this objection. The said hydraulic closer or cut-off 85 consists of depending nippled connections 86, connected together at their bottom by a cross nipple 87, which together forms a depending U-shaped portion, which constitutes the closer. The same derives and fills itself principally with the water from the cylinder 56, which, trickling down through the sectors therein finds exit through the drain pipe 60, communicating with the closer, which when sufficiently filled prevents any gas from the first purifying cylinder from passing therethrough and allows nothing but the condensed water and the other products of condensation from finding exit therethrough. The water in the closer always maintains the same level, and the accumulation of the condensed products from the first purifying cylinder, together with the slight pressure which the entering gas may exert thereon, is sufficient to force the fluids around through the closer and out through the common drain exit, while at the same time, as stated, the pressure of gas would not be sufficient in itself to force a passage down through the depending U-shaped closer or cut-off.

Pneumatic Separation.

Mr. Walter J. May, writing to a contemporary on this subject, says that among the various uses to which the air can be placed is that of separating substances of different weight, whether such is caused by either size or specific gravity; and besides the mere separation of the particles, grading can be done to such a degree that the final grade is so immeasurably small that no machine made could be affected by the presence of one of the atoms. At the same time, the whole of the apparatus can be put up at an extremely cheap rate, and for many things in which water separation is now used, pneumatic work would give as good a result at only a fraction of the cost for either machinery or labor. Still, it must be taken into consideration that while comparatively large sizes can be taken by a wet process, and that perhaps water will deal with substances having a lesser difference in specific gravity, yet when small or well crushed material is in hand, air both separates and grades better than water. It is, however, necessary to take into consideration the purpose for which the separation is done, as on this much of the detail will depend; because if the work is only for grading, a somewhat different method will be wanted to where concentration and cleaning are the objects in view. Thus, a mineral pulp (dry) which is of one specific gravity, but which varies in the size of its component particles, if propelled by a current of air in a straight line, will be graded from the largest to the smallest particles, but no sharp lines of division will be shown. On the other hand, if a mineral pulp consisting of equally sized particles of different weight be treated in the same way, the heavier portion will fall first, and the lighter ones be carried to the greater distance, the line of separation being fairly well marked if a regular velocity of air be maintained, only a very small amount of mixed material being left to be again treated.

As to the advantage of pneumatic separation, there can be no doubt in certain places—say where there is a scarcity of water; and where this occurs wet processes of separating non-magnetic minerals become of doubtful benefit, owing to the loss of time which takes place where there is no water. In many such cases pneumatic processes may be used with advantage if care is taken to arrange the machinery right; but of course the wider the difference in weight and the closer the sizing, the more perfect the separation.

As to what can be treated by pneumatic separation, perhaps the following may indicate. Some 30 years or more ago rabbit hair was used in the manufacture of hats, and according to the fineness of the hair, so the quality of the hat increased; and this, of course, necessitated the grading of the hair, which was done somewhat as follows: The skins were first gone over by hand and the coarse hairs pulled out, then the skins were cleared of the undercoat of fine hair, which was thoroughly shaken apart in some way, and the hairs in this disintegrated condition were propelled along a flue, or long chamber, by a current of air produced by a blowing fan, and the hair was deposited along the chamber according to its fineness, the coarsest hair being nearest to the inlet, and the finest parts being at the farthest point. Now, in this case the air current would have, comparatively speaking, a low velocity; but at the same time the material was very light, and a regular current would have to be kept up at practically what was an unvarying velocity to secure level work. Coming to later days, we have the various mills grinding phosphates, paint stuffs, and other hard materials in a dry state, using pneumatic separation, and in all the principle is practically the same, exhaust fans being used instead of blast fans, the material being, as it were, sucked along the flues into the settling chambers, the fan being at the end, and not at the beginning of the work. Taking a Globe mill, grinding general materials, from bones to basic slag, the arrangement is to draw the fine material up a vertical flue, from whence it passes into a horizontal chamber, and settles into hoppers or bins, only the finest dust going into a final settling chamber after passing through the fan. This in practice answers perfectly, and the fineness of the material drawn off is, to a certain extent, under perfect control without any very long depositing or settling chambers being necessary. The extremely fine dust which passes through the fan is the most difficult to deal with, and in the case of paint stock and some kinds of manurial substances this is a most important part; therefore it is passed into a chamber where the air can remain perfectly still for a short time, or where this is not practicable a vortex or cyclone arrangement is used to separate the dust from the air.

As to what can be separated pneumatically, there is practically no limit, if it be below say ¼-inch cube in the case of mineral substances, and there is a difference in either size of the grains or particles, or in their specific gravity.

It is not possible to describe with any accuracy any general plant for treating everything, as obviously such could not be done, and in every case local considerations have to be studied. Roughly, for grading only, a long rectangular chamber about 3 feet wide and from 8 feet to 12 feet high would be needed, the length being dependent on the material treated, but from 30 feet to 50 feet long being about the thing. A fan would be required to cause the air current, and a settling chamber for the very fine dust if such had to be saved. Grinding and sizing appliances would be also necessary with some things, and these may be of

any form so long as the sizing is pretty closely done where the grains vary much in weight. As an example, we might take, say, graphite (1.987 specific gravity) and sand (1.750 specific gravity) where the sizing must be very close, the difference being only 0.237, which, if the grains of both substances are equal in size, does not allow too much margin for good separation. On the other hand, if we take iron ore (4.900 specific gravity) and sand, the difference (3.150) is such that a less close sizing would be necessary, as one volume of ore is equal to 2.80 volumes of sand in regard to weight, or *vice versa* in regard to bulk, and therefore, if the grains of sand contain 2½ times the volume of the grains of ore, good separation must result if the air velocity is right. As to this air velocity, it must be just enough to support the whole of the material for 3 feet to 5 feet, but not enough to carry all the material the length of the chamber, and the exact velocity can only be ascertained by actual practice. In fact, with all separating processes, actual practice is the only method of dealing with speeds, etc., as a very slight alteration in any detail throws the whole theoretical measurements out of gear. Anyhow, pneumatic separation is well worth consideration for many purposes, and should receive more attention at the hands of experimentalists than is now the case.

Production of Coke in the Flat Top Coal Field, Virginia.

[Abstracted from Census Bulletin, No. 200, compiled by Mr. Jos. B. Weeks.]

The Pocahontas Flat Top coal field has rapidly sprung into prominence during the last eight or nine years owing to its excellent coal for fuel and cooking purposes. Originally the coke produced in this district was chiefly employed in Virginia, but the amount shipped to the southern districts in Tennessee and Alabama has constantly increased during the last five years, until it has reached a very respectable proportion of the whole output. The coke will at no distant day be made a formidable competitor to Connellsville in the western iron districts, by the opening up of a new line of the Norfolk and Western Railroad.

The manner in which coal is won and sold in this district is worthy of notice. In 1889 the coal mining companies all leased their lands from either the Flat Top Coal Land Association or from the Crozer Land Company, under a royalty of 6 to 10 cents per ton, and under an agreement to sell all their coal through the Pocahontas Coal Company. The selling of the coke is conducted on partially similar lines, as the makers pay 15 cents a ton royalty, and are practically bound to sell their product through the Hull Coal and Coke Company. The furnaces on the land owned by the Association are bound to use the Flat Top coke only.

Geographically, the Pocahontas Flat Top field is situated in the county of Tazewell, in southwestern Virginia, and in the counties of Mercer and MacDowell, in southeastern West Virginia. It can be divided roughly into three districts, viz., the Pocahontas district, the Bluestone district and the Elkhorn district. The name "Pocahontas Flat Top" is a combination of Pocahontas, the original name, derived from the town where the first mining was done; and Flat Top, the name of the mountain range in which most of the coal seams are located.

Geologically, the coals of this field belong to the lowest member of the coal measures, No. XII of Rogers, the Pottsville conglomerate of Pennsylvania. There are on the field at least three workable beds above water level, but only one, the "Pocahontas," is being worked as yet. At the town of Pocahontas it is 11–13 ft. thick; on the Virginia line it is 11 ft. thick and diminishes to 5–6 ft. on Flipping Creek and to 6–9 ft. on the Elkhorn. The average thickness worked at Pocahontas is 9 ft. This seam is absolutely without a slate parting, but it is split into distinct workable seams by a thin streak of bone coal quite rich in carbon. This bone coal increases in thickness northward, reaching 6–7 ft. on Flipping Creek and dividing the bed into two seams.

The seam is also free from faults. Everything handled by the miner is placed in the wagon, excepting a small streak of bone coal found near the top and certain portions of the coal at the openings which has been discolored by the water. This latter portion, however, gives as good an analysis as the remainder of the coal, and is apparently only discarded for appearance sake. About 220,000 acres are held by the two controlling land companies, and from detailed surveys it appears that 175,000 acres can be classed as actual coal lands. At present only about 1,000 acres have been undermined, with an average output of 9,156 long tons per acre. When it is considered that only about 55,000 to 60,000 acres of coking coal remain in the Connellsville region, the extent and value of the Flat Top field can be readily appreciated. A most interesting and valuable statement has been made by the Flat Top Land Association, showing the acreage and tonnage of coal mined on its lands from the beginning of operations to December 31st, 1890. This is presented in tabular form herewith:

Name of Company.	App'imate thickness of vein in feet.	Number of acres mined.	Number of long tons per acre mined.	Perce'tage obtained per acre.
Southwestern Virginia Improvement Co	9.0	481.0	8,819	61
John Cooper & Co	8.0	116.0	9,273	72
Caswell Creek C. & C. Co	7.7	87.1	10,076	81
Booth-Bowen C. & C. Co	6.8	69.5	9,975	91
Buckeye C. & C. Co	6.5	68.4	10,121	96
Goodwill C. & C. Co	4.7	32.1	7,133	94
Louisville C. & C. Co	4.8	19.1	7,401	96
Elkhorn C. & C. Co	7.5	17.2	10,370	86
Shamokin C. & C. Co	7.5	17.2	10,467	87
Norfolk C. & C. Co. No. 1	7.5	11.1	10,806	89
" " " 2	7.0	0.7	11,161	99

Lick Branch Colliery: Total acres undermined, 899.7; total number of long tons mined, 8,237,734; average number of long tons per acre mined, 9,156.

The following table gives average analyses of Flat Top coal and Connellsville coal, made by the H. C. Frick Coke Company:

Component parts.	Flat Top.	Connellsville.
Volatile matter	18.812	30.107
Water	1.011	1.260
Fixed carbon	72.708	59.616
Sulphur	0.787	0.784
Ash	5.191	8.233

An inspection of the analysis does not warrant the belief that Flat Top coal is particularly suited to coke making. Though it is low in ash, it would be regarded as too low in volatile matter to agglutinate properly.

It makes a good enough coke when burned as "run of mine," but is greatly improved when prepared by crushing, as otherwise many large lumps come out "roasted" instead of coked. It is not so bright as Connellsville, it is more friable and contains more fixed carbon. The coke makes a first-class furnace fuel, capable of carrying in the furnace as heavy a burden as the Connellsville and having much less ash. The coking process is, however, carried on at the expense of a considerable portion of fixed carbon. A ton of coke takes at least 1.6 tons of coal containing on the basis of 72.708 per cent. of fixed carbon, 116.33 units of carbon. The coke contains only 91.50 units of fixed carbon, so that there has been a loss of 24.83 units of carbon in the coking process, or more than one-fifth of the fixed carbon contained in the coal. As a matter of fact, many makers say that they do not obtain so much as 62½ per cent. of coke. In coking Connellsville coal the loss of fixed carbon is much less.

The ovens used in the district during the census year were, without exception, of the beehive type. Some experiments had been made with the Soldenhoff-Coppee oven, but, though admirable results were obtained, the oven has not been introduced in practice. The earlier ovens were 11 ft. and 11 ft. 6 in. in diameter, and from 5 ft. 6 in. to 7 ft. high; but all those recently constructed are 12 ft. diameter and 7 ft. high. It is said by some authorities that these ovens are too large, as the smaller ones burn more actively and quicker than the 12 ft. ovens. The waste, however, is really caused by the fact that after drawing an oven, in order to restore the initial heat necessary to agglutinate a dry coal, a portion of the fixed carbon is consumed. This loss depends a great deal on the skill of the labor employed. Ovens are unduly saturated with water, and the time taken in drawing is unnecessarily prolonged. The ovens do not differ materially from the ordinary beehive oven. They are arranged 3 in. apart, in two rows 6 in. apart. They are 12 ft. in diameter, 6 ft. 6 in. high in the center, one brick thick, and they have their necks projecting so as to remove the door as far as possible from the excessive heat of the charge. The charge of coal is about 9,000 lbs. for 72-hour coke, and 8,000 lbs. for 48-hour coke.

Very good results were obtained with the Soldenhoff-Coppee oven. About 175,650 lbs. of coal from the Bluestone district were sent to the Coppee ovens in the New River district. Of this amount 46,850 lbs. were "run to mine" and the remainder slack. The average yield was 67.5 per cent. and the 36-hour to 48-hour proved the best.

There is a great diversity of opinion among the operators as to the cost of coke. The figures given range between $1.35 and $1.75 per ton. No doubt the diversity arises in some part from the difference of opinion as to the price at which the coal should be charged to the oven. The fairest way, however, would be to charge it to the ovens at cost, *i. e.*, at an average of 55.8 cents per short ton without royalty. The cost of coking per ton of 2,000 lbs. of coke is: Charging, 2 cents; leveling, 3.2 cents; drawing, 20 cents; general labor, 2½ cents; cleaning ovens, 1 cent; supplies and repairs, 7 cents; total, 35.7 cents. The cost of a ton of coke will then be as follows: 1.6 tons of coal at 55.8 cents, $0.8928; cos

of coking, $0.3570; general expense, $0.0500; royalty (15 cents on 2,240 lbs.), $0.1340; total, $1.4338. It would be fair to assume, therefore, that $1.40 to $1.45 is the cost of coke at well managed works. A statement made from the returns for 1889 would show a higher cost, as will be seen from the following items of cost as returned:

Value of coal used	$302,742
Royalty on 321,686 short tons at 13.4 cents per ton	43,106
Cost of other materials	8,913
Total wages paid	149,727
Total miscellaneous expenses	14,084
Aggregate cost at ovens of 321,686 short tons of coke	518,572

This gives an average cost of $1.612 per short ton, which represents the average cost at economical and uneconomical works.

Three analyses of Flat Top coke are given in the following table:

	No. 1.	No. 2.	No. 3.
Moisture	0.700	0.664	0.347
Volatile matter	1.270	1.059	0.757
Fixed carbon	91.430	92.816	92.550
Ash	6.090	4.913	5.749
Sulphur	0.509	0.548	0.597

In the following table are given some interesting statistics of the production, etc., from 1883 to 1889 inclusive:

	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Number of establishments	1	1	1	2	5	13	17
Ovens built	200	200	200	210	684	1,282	1,833
Ovens building	....	....	....	238	842	200	631
Coal used, short tons	39,000	99,000	81,899	100,518	240,814	312,014	517,613
Coke produced	22,718	57,107	50,194	60,436	150,708	201,317	321,686
Total value of coke at ovens	$44,345	$111,300	$85,993	$155,771	$271,276	$358,938	$542,219
Value of coke at ovens per ton	$1.951	$1.948	$1.713	$2.577	$1.800	$1.782	$1.686
Yield of coal in coke, per cent	58	58	61	60	62.5	64.5	62.15

The total value of the ovens put down is given as $657,521, which gives $359 as the average cost of each oven. The chief material used in the production of coke is coal. Of this 517,613 short tons, valued at $302,742, were used in 1889, and the remaining materials and supplies amounted only to $8,913. During the same year 533 hands were employed, and they received $149,727 in wages.

[Communicated by Norton H. Humphrys, Assoc. M. Inst. C.E., F.C.S., to the *Journal of Gas Lighting.*]

Coal Analysis.

This subject has been attracting considerable attention lately, so far as one may judge by the letter from Mr. James Stelfox in the *Journal* for July 19 (p. 120), and by the paper* read by Mr. John M'Crae, and the discussion that followed it, at the recent meeting of the North British Association of Gas Managers. The latter, indeed, appears in some respects to be behind the times. Every gas engineer knows that it is not possible, on the working scale, to come up to laboratory results. It is not possible to do so with oil; with the various processes that come under the head of water gas; and (as many know to their cost) with various "patent" processes that have from time to time been put before the public. Or, to go beyond the realm of gas making into the various operations of applied chemistry, it is the usual experience that laboratory tests cannot be taken as an exact model of commercial results, and that a large margin must be left for practical contingencies. Why, then, should a gas engineer expect to equal, on a large scale, the results of laboratory experiments—especially in such a delicate operation as the manufacture of illuminating gas, which is of such a complex character that the best informed on the subject can only lay down a rough outline of its nature. These facts have been so far recognized in England, at any rate, that many coal factors prefer to furnish the results of practical trials, covering several truck loads of coal, in the place of the much abused "printed analyses." And its seems reasonable to suppose that any coal merchant doing business on a substantial scale, would be willing to furnish references to parties using the particular coal in question, or other information of a practical character, if requested to do so.

The recommendation to take careful tests of the various kinds of coal available for use, seems almost superfluous; for how can a gas engineer, who has not troubled to make such tests, know whether or not he is working to the best advantage? The information afforded by the annual statistics is at best a very irregular guide, even if only one or two kinds of coal are used; and it is of no use at all in works where several sorts are purchased. In many cases the tests must be of a rough-and-ready character, simply because the manager cannot spare the necessary time, or, rather, secure the necessary freedom from interruption. However, the only plan is to make the best of circumstances; and it is in the power of almost everyone to arrange for a few careful tests of coal.

Mr. M'Crae appears to have struck a popular chord in asking that the printed analyses should furnish a close approximation to the results likely to be realized in practical working. But no suggestions conducive to this end were forthcoming, beyond the recommendations of tests on a practical scale. But these fail to meet the difficulty, because the discrepancies between practical working with the same kinds of coal are very considerable. The "Transactions" of The Gas Institute for 1882 include a number of statistics from various gas works; and a noticeable feature is the variation in the returns as to yield of gas per ton, and quality, obtained from the same kind of coal at different works, in various parts of the country. "Practical working at a gas works" is a very wide term. A gas works may be anything between a first class modern plant, including regenerative furnaces, adjustable condensing area, and every possible refinement, and the collection of antiquated "cast-off clothes"—second-hand apparatus gathered from all points of the compass, not because it is efficient, but because it is cheap—that is occasionally to be found doing duty in small villages and in some country towns. Then there is the personal element. The intelligence and skill that provide the design for the first-class works, also extend to the arrangement for proper supervision, and continual watchful control, without which no set of plant, however efficient, can be worked to the best advantage. But the small works that is evolved out of second-hand apparatus purchased from larger undertakings, is frequently left entirely to the tender mercies of a more or less unqualified working foreman. Between these two extremes, there is room for a discrepancy in results, much greater than that prevailing between the tallest of laboratory analyses and the best practical working. There is yet another consideration. The practical working of to-day is a great advance on that of 25 years ago; and we are yet a long way from perfection.

There are two points that might be stated on the analysis form. These are the manner in which the sample was taken and transmitted to the analyst, and a description of the quantity tested and the size of the retort used for the experiment. If, for instance, we see that, under the first head, the sample was taken in the colliery itself, put into a tight, strong box, forwarded to the operator, and examined within a few days of its being taken from the pit—we should know that, apart from any other considerations, the yield of gas will be much better than could be expected from a sample of coal that had been stored for a few days at the colliery, loaded into a truck, exposed to the weather for a day or two, and to the vibrations of a 100 or 200 mile railway journey, unloaded, and then stored for two or three months, perhaps in the open. The remarks made by Mr. G. R. Hislop show very pointedly the advisability of keeping coal intended for gas making from exposure to the weather throughout the whole of its life. It should be loaded into covered trucks at the colliery, and transferred to the coal stores under cover, on arrival. In the case of sea borne coal, the matter is still easier to deal with. If 0.5 per cent. of water affects the working results to anything like the extent of 4 per cent., any possible extra cost necessary to preserve the coal from rain, etc., would be recouped many times over. Then as to the size, etc., of the retort used for the experiments. If it, for instance, was stated, "2.24 lbs. and the sample carbonized in a cast iron retort, heated by a Fletcher's gas burner," we should know at once that the sample had enjoyed several advantages that are not possible in practical working? In the laboratory, the retort is raised to the temperature deemed to be advisable or best for working, before the charge is introduced. The retort is large in area, and contains a large proportion of metal, as compared with the weight of the charge, which means that the average temperature of distillation will be higher in the laboratory than is possible in practice. A charge of 2 to 3 cwt. of coal, introduced in the usual way, has such a cooling effect upon the retort that a long time elapses before the bulk of the coal reaches a red-hot temperature. This is not attained until a large portion of the volatile matter has been driven off. But in the experimental retort, the charge is only

* See JOURNAL, August 22, p. 261.

1½ to 2 inches thick; and if the heat be good, the charge is worked off very rapidly. Some coals will be entirely exhausted in 20 minutes. Cast iron is a much better conductor of heat than fire clay; and the experimental retort is sound and free from cracks, which is not always the case in practice. If it were possible to carbonize coal in perfectly sound retorts, that were raised to a good carbonizing temperature, without regard for fuel or for time, before introducing each charge, a great improvement in results would be obtainable. In a similar manner, we might follow out the differences in condensing, purifying, and storing between the experimental and the practical ways of working.

From practical experience, we know that the yield of gas from a coal that has been exposed to the weather, is less than if a similar quality of coal is used while in fresh condition. We also know that some coals stand the weather fairly well, while others rapidly deteriorate; and in a rough way we assume that the rate of such deterioration is affected by the capacity of the coal for absorbing moisture. Hard, close textured cannel coals will stand exposure without much injury. But soft, friable and porous coals are soon spoilt. The question is of sufficient importance to call for careful investigation; and it is possible that the results of searching inquiry might lead to important modifications in the way of treating coal required for gas making, at the colliery, in transit, and also at the gas works.

With regard to the sampling of coal for analysis, the responsibility for this must rest with the coal factor. If an analyst receives a box of coal accompanied by a request for an analysis of it, he is scarcely in a position to raise the question as to whether the sample is a good or bad one. The sender might reply that if he could not undertake the analysis, there were plenty who would. Nor can the analyst be held responsible for the use that may be made of his figures. No doubt, there are evil and good amongst the coal factors, as there are amongst all classes of the community; but it is not just to the coal trade as a whole, that it should lie under the charge of favoring exaggerated or misleading reports. And even if an expert received *carte blanche* to come to the colliery and make what arrangements he considered to be necessary for securing a fair sample of the produce, there is the question of how far such a sample would hold good. Would a sample taken to-day be a fair representation of the coal won in the same colliery in a year's time, or in seven or in twenty years? While some coals remain practically the same, others vary from month to month. Sometimes the supplies from one shaft represent as much variation as obtains between differently named coals. With homogeneous products such as sulphur, pyrites, iron ore, or any mineral having a fixed and definite constitution, it is a perfectly easy matter to specify for certain conditions of purity. But nothing of a similar nature can be fixed as regards coal. There are only the results obtained from it to go by; and no factor would care to sell under guarantee, except with the addition of saving clauses, enabling him, in the event of any dispute arising, to enter upon the works and see whether a share of the fault, at any rate, might not rest with the working methods. There is one way in which the purchaser might be protected to some extent. That is by the proximate analysis of the sample. Agree upon a method for determining loss of weight, by exposure at 211° F., say, for an hour, or any degreee of temperature and period of time that research might indicate. So with regard to volatile products, and also to incombustible matter. Then let it be agreed not only that the supply should come from one pit, but also that it should not vary, to any practical extent—in the matter of moisture, volatile matter, and ash—from the figures obtained from an approved sample. By this means, the presence of stale coal, of small, or extraneous matter, could be detected. Stale coal would naturally show an increase of moisture; and dirty coal a larger amount of ash.

Mr. Stelfox deals very briefly with the subject. He simply publishes three analyses, supposed to represent the same kind of coal, but different from each other in several respects; and he dismisses the subject with the remark that "comment is needless." I do not agree with him. On the contrary, I think it would be very useful to the profession at large if the matter was further inquired into, and the cause of the discrepancies explained. It would be quite as easy to produce parallel cases from actual practical results, showing quite as large divergences as those to which Mr. Stelfox directs attention. As already remarked, the results obtained from the same kind of coal as used in different works vary widely. Are we quietly to accept the fact as unavoidable? I think not. Taking the highest result obtainable in the laboratory as our guide, we ought to work in the direction, first of determining where the actual cause or causes of the deficiency that obtains in practice really lies, and then of so improving our ways of working as to diminish and eventually to remove it. The history of gas operations, from the days of six-hour charges in iron retorts, up to four-hour charges in the latest development of regenerator furnaces, offers every encouragement. Comparing the practical results of twenty years ago with those of to-day, and both with laboratory analyses, we may say that the chasm between the practical and experimental method of working is nearly half bridged over.

The arguments against the publication of laboratory analyses of coal seem to me to follow much the same lines as an impatient student does when he throws his trigonometry primer on the floor because his problem will not come right. The analysis has its proper place and station, and some will rate it too highly, while others go to the opposite extreme. The objection raised as to the difficulties and unpleasantness caused by analyses getting into the hands of chairmen and directors, or other persons who are likely to make blind or partially blind comparisons, to the undeserved detriment of some capable official, applies with equal force to any kind of published statistics, financial or otherwise. It is only natural that directors should "whip up" their engineers a little, if the opportunity offers; and whilst it must be admitted that the majority of gas-works managers need no stimulus of this kind, it would be idle to deny that there are some who bring it on themselves. A chance remark may be passed; but I think there are very few cases where a really deserving officer suffers at the hands of his board, simply because his results may not compare favorably with others.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Mr. E. D. Johnston, Vice-President and General Manager of the P. H. & F. M. Roots, writing to the Journal, from Connersville, Ind., under date of September 9, says: "Recently there has been a change of ownership made in our Company, and the officers now are as follows: President, J. N. Huston; Vice President and General Manager, E. D. Johnston; Secretary and Treasurer, Charles Mount; Superintendent, John McKellips. The only changes being in the instance of Messrs. Huston and Mount. Messrs. D. T. Roots and E. T. Roots retire from the Company." Mr. Johnston, in closing his letter, says: "We will continue to push the sale and merits of the great Roots exhausters, and are always pleased to give anyone interested information concerning our machines."

The above news is somewhat surprising, in that we, in common with very many others, held the belief that while the lamp held out to burn some member of the Roots family would be actively connected with the concern that bears their ancestral name. Of course there must be some good reason for the changes, but irrespective of whatever that reason may be we regret the move, whether the same were the result of necessity or choice. Our recollections of the Roots family can never be other than pleasing ones.

In other issues we have called attention to the determination reached by the proprietors of the Greensburg (Pa.) Fuel Company, who had hitherto been engaged in the distribution of natural gas in that town, to erect and operate an artificial fuel gas plant—the supply of natural gas having failed materially. Continuing, we can now report that the Company has contracted with Mr. Joseph Askins, of Lima, O., for the installation of a plant of the type erected by him at Bellefontaine, O. The buildings and machinery, which will be located in South Greensburg, are said to be contracted for at a price not to exceed $26,000, and it is further said that the plant will have a maximum capacity of 1,000,000 cubic feet daily. The work of construction is to be completed by October 27th. In the meantime, it is well to ponder somewhat over these bare figures, which look altogether too inconsiderable, placing them in juxtaposition with the results which they are presumed to secure. We hope to be able in the near future to say something more explicit about this Greensburg experiment, for an experiment it undoubtedly is.

The Southern Fuel and Gas Company, with headquarters at Richmond, Va., was, as we formerly noted, incorporated for the purpose of exploiting the gas making process, letters patent for which were granted to John M. Bailey, on July 12, 1892. Of course our readers are not likely to be very greatly interested in this scheme; but as they have been amused, if not instructed, by references such as those that related to the corn cob and potato extract process, the Sanitary gas process, and so on, perhaps a few gems from the circular the aforesaid Virginia Company is sending out broadcast may be not altogether amiss. We have been favored with a copy of the circular, which seemed as though it came direct to us from the Company's headquarters, hence we "violate no confidence" in printing a few of its extraordinary lines. We do not know whether we are indebted to Director Charles R. Skinker, Esq., or

to Mr. Beverly T. Crump, Attorney for the Company, for the delicate attention shown in the forwarding of the circular—but that really "makes no matter." Dispensing with any reference to what may be termed the preliminaries, and going at once to the pith of the matter, we find the following balderdash coolly served out for fact: "The apparatus is extremely simple, cheap and durable; the process is new and so simple that a boy 15 years of age can easily operate a large plant. The expense of labor, which forms so large an item in the manufacture of gas by other systems, is *almost entirely* eliminated. The process consists of *forcing atmospheric air* through a generator charged with crude petroleum, the temperature of which is gradually raised from 120° to 180° F., as the gravity of the oil is lowered by the evolution of gas. The air in passing through the generator is most intimately commingled with the oil and absorbs sufficient hydrocarbon from the oil, so that by the combined influences of heat, *friction* and *pressure*, it is transformed from simple atmospheric air into *a fixed gas*, for all practical uses, and which serves *all the purposes of coal and natural gas*." The italics are ours, and we submit that this is beyond doubt a marvelous gas; but we are retarding the denouement. The next paragraph says: "That for heating, cooking and other domestic purposes, as well as for illumination, it is unrivalled either by coal or natural gas or electricity. By this system *one gallon of crude petroleum produces over* 2,000 *cubic feet of gas*, and about one quart of superior lubricating oil. Crude petroleum can be obtained in quantity, delivered in Richmond, at less than 3 cents per gallon. The value of the lubricating oil is from 15 to 25 cents per gallon." Now, in the event that the gas was not all that was claimed for the same, it looks to us that Skinker, Crump and Company could do pretty well by simply falling back upon the Bailey patents and system as methods for manufacturing lubricating oil. Taking the average value (!) of the lubricating oil at 20 cents per gallon, and remembering that the "crude" is worth only 3 cents a gallon, the "one quart" residue out of the gallon would be worth not less than 5 cents—a very fair margin of profit, even after allowing for the wages of the "boy, 15 years of age," that operated the plant. Returning to the circular, we learn that "1,000 cubic feet of this gas burned under a steam boiler will evaporate over 300 pounds of water—which is equal to 10 horse power per hour"—we acknowledge that we are unable to "follow" this last conclusion, and we are equally at a loss to get at the true inwardness of the following further lines of the circular, which lines are given as a final sample of the imbecility of the exploiters—our readers will note that the "boy" becomes a "man" as the tale is unfolded: "The apparatus, *whether large or small*, requires the attention of but one *man*. The cost of making steam, heating buildings and for cooking is less than one-third that of coal, while the labor, dust, smoke, ashes and dirt are entirely eliminated. The actual cost of running a 50 candle power gas light, 10 hours per day, will not exceed two cents per week." And some people who actually are able to manage an ordinary line of business will "invest" money in the shares of the Southern Fuel and Gas Company.

If the statements in the circular proper were not sufficient to condemn the whole thing, an appendix thereto on the last sheet of the precious document should complete the condemnation. This is afforded in a report on the gas to the Company, by Dr. Henry Froehling, a Consulting and Analytical Chemist of Richmond. The Doctor, among other things, says that "From the *small amount* of hydrocarbon and other *combustible* matter contained in it, its cost must be extremely low." We should say so; and we further say that the Company is in no wise indebted to us for this liberal advertisement of its claims.

Secretary Cullinane, of the Dennison (Texas) Light and Power Company, writing to us under date of the 8th inst., says: "I see you know of our fire on August 26th, as per Journal of September 5th. It was not as damaging as was reported. The fire was all confined to the roof, and will not delay us any. None of our new machinery was set save the two new benches, and they escaped very well. Did not stop making gas."

A meeting of the shareholders of the Columbus (Ohio) Gas Light and Coke Company will be held October 6th, to make the formal transfer of the property to its successor—the Columbus Gas Light Company.

The annual meeting of the Providence (R. I.) Gas Company was held on the 5th inst., a large representation of the shares being in attendance. The agreement between the city and the Company, respecting the sale of gas in Providence for the next 20 years, was formally ratified. The following Directors were elected: Col. William Goddard, the Hon. Amos C. Barstow, and Messrs. Alpheus B. Slater, Royal C. Taft, Edward Pierce, Jesse Metcalf, G. W. R. Matteson, Lucian Sharpe and Newton D. Arnold. The Directors subsequently perfected the following organization: President, Hon. Amos. C. Barstow; Vice-President, Col. William Goddard; Secretary and Treasurer, Alpheus B. Slater.

The annual report of the Directors of the Providence Company to the proprietors is appended:

"The amount of gas produced for the year ending with June 30th, last, was 615,071,000 cubic feet, showing an increase over the previous year of 20,166,000 cubic feet, or about 5¾ per cent. Of the whole amount produced 58 per cent. was coal gas and 42 per cent. water gas. The gain of the past year over the preceding year was equal to the whole amount of gas produced in 1855, after we had been in operation seven or eight years. The receipts for residual products for the year were $52,744.69. This shows a reduction in the gross receipts for these products as compared with the preceding year of $6,753.51. This is a natural result of the reduced consumption of gas coal, from which all these residuals come. During the year we have laid 39,252 feet of main pipes, equal to nearly 7½ miles, which gives us an aggregate of 181 miles now in the ground and in use, besides about 6 miles of pipe laid by the Citizens Gas Light Company, still in the ground and unused. This is mostly small pipe, none of which could be wisely lifted from its old bed during the year. Besides the large amount of new mains laid, we have to report 11,241 feet (or about 2⅛ miles) of old pipe relaid, or replaced by larger and better pipe. The number of meters now in use is 15,909, an increase of 1,284 during the year. The increase is 184 greater than that of the previous year, which was the largest ever before reported. Probably no growing city in the country is so well equipped in every department to meet the exigencies of the present or the near future for a full supply of gas as is this city. It has been the practice of this Company to largely anticipate the wants of this growing city. Never for an hour has the city been left in darkness by lack of gas to meet all calls on us; and large as our output now is, we could easily add 20 to 25 per cent. to it, on demand. There has been no change in the price of gas since July 1, 1890. At that time our price was reduced to $1.25 per 1,000 cubic feet to the city, and $1.30 to all others, equal to a gross reduction of about $40,000 per year. We had already entered upon the work of erecting the water gas plants, which we now report as finished, at a cost of about $200,000, and had then but recently completed our largest holder, at a cost of $100,000. Instead of issuing new stock to cover these large expenditures, we used what money was then in hand, and against our usual practice, incurred a large debt, hoping to recoup ourselves by a considerable saving in the cost of manufacture by this new process, notwithstanding the great reduction then made in the price of gas. This we have done in part, and may hope to complete during the coming year, unless prevented by the clause in our new contract with the city of Providence for extension of franchise (now made exclusive), which binds us to pay to the city 3 per cent. on gross amount of receipts for gas sold in the city during the time specified in contract, say 20 years, from August 8, 1892. This contract will be laid before you for ratification. Besides the obligation above named are others which you will observe, viz: 1st, to limit our dividends to 8 per cent., and, 2nd, not to charge higher prices for gas than we now charge; and after covering cost of extensions and improvements, and reserving a reasonable sum to cover exigencies, to make from time to time such reductions from present or ruling prices as we may be able to do during this period of 20 years. We think that we should have had the 20 years of rest (which this new contract promises) from competition, or threatened competition, in the supply of illuminants other than we now have, in oil, gasoline and electricity, without pay to the city treasury; but we love peace and quiet, and have deemed it better to pay the price demanded rather than be exposed again to the rasping irritations of the last 15 years—as profitless to the city as to us. We have been grateful for the evidence accumulating for the last few years and which this contract confirms, that the City Council could see no more reason for encouraging a competition in the supply of public gas than of public water; and had come to the conclusion, long ago reached by London and other cities in the Old World, where gas is cheapest, to allow no two companies to operate in the same district if in the same city. We get from the city in this contract no new rights or privileges, and no concessions except promise of freedom from the raids upon our business and franchise which have characterized the last 15 years—raids which have proved as troublesome to the city as to us, if not as costly. It has been the aim of the Board to cultivate the most friendly relations with the city government—to meet its wishes promptly, even when extensive changes of grade like that at Corkey Hill, south of Wickenden street, or new outlay of Parks, as at Hope street reservoir, etc., required relay and long extension of our

mains, always made at our expense and often with no promise of compensating advantage to us at the present, or in the near future."

On the 12th inst. the proprietors of the Galion (O.) Gas Light Company entered into a contract with Mr. C. R. Miller, representing the Askins water gas process, for a complete set of water gas apparatus of the Askins type. The contract also calls for the placing of a double set of purifiers, the boxes to be 10 feet by 10 feet. The contractors guarantee to turn the work over to the Gas Company on or before November 15th.

A correspondent at Columbus, O., forwards the following notice, clipped from the Sunday *Morning News*, of that city, of date of August 28th. It reads as though it emanated from Manager Butterworth, and it looks to us that other Companies might be benefited, did their managers cause the publication in their local papers of something akin to it. The notice is: "Now that summer has passed and the days are shortening, gas bills will naturally grow larger until midwinter is reached, when they will again begin to decrease. A great many more Columbus people than usual have been summering out of town this year, and we may expect a corresponding increase in the number of individuals who make the remarkable claim that 'their houses were closed up for three months and no gas was consumed, and yet the bills came in as large as ever.' Before making or believing such assertions, it might be well for you to first communicate with the Gas Company, who will doubtless be able to satisfactorily disprove or explain them. And on general and businesslike principles, if anything goes wrong with your gas lighting, from a dirty burner to an apparently exorbitant bill, instead of grumbling to your neighbors or complaining through newspapers, it would be far more reasonable for you to lay the matter in a proper spirit before the Gas Company, whose business and interest it is to promptly attend to such complaints—just as you go to a doctor when you are sick."

Advices from Milwaukee, dated Sept. 7th, rather go to show that the executive and engineering ends of that corporation builded better than they knew, when the handsome and commodious new plant was installed some time ago; and also that their belief in good and cheap gas was the broad avenue that led on to profit. However, the "advices" from the Cream City will best tell the gas story there of the current time: "The Milwaukee Gas Light Company has in contemplation a project which will finally result in the erection by that Company of a large plant on the West Side, which will be operated in conjunction with the present works on Erie street. This improvement will, however, not be made for some time, but in order that the West Side patrons of the Company may be furnished with all the gas necessary, the Company expects before long to begin the construction of a large gasholder on the property upon which the new gas plant will eventually be built. The supply to the new holder will come from the East Side plant, and will be sent directly to the West Side by means of a suitable leading main. From thence it will be distributed by means of branch mains over the West Side. The pipe changes involved will alone constitute a big undertaking. Secretary Kremers, of the Company, yesterday (Sept. 6th) confirmed the report that the new holder would be built at once, and it was proposed, he said, to eventually put up a manufacturing plant on the West Side. He also added that the increase in the Company's business, since it had reduced the rates, had been steady and gratifying; that the number of people who used gas for illuminating purposes was increasing, and that in the instance of the increased use of gas for fuel purposes this could be well understood when it was known that but 500 families had gas stoves in 1891, whereas now 3,300 families used them."

The residents of Cadiz, Ohio, at a special election held early this month determined, by a vote of 239 in favor to 12 against, to grant a franchise to an electric lighting company.

At the annual meeting of the Saratoga (N.Y.) Gas and Electric Light Company, the following Trustees were elected: Messrs. William Foster, Jr., R. T. McDonald, Joseph F. Blaut, C. F. Stone and A. W. Trotter, of New York city; Elias H. Peters, of Saratoga, and W. V. Reynolds, of Reynoldsville, N. Y.

The Northampton (Mass.) Gas Light Company has connected its works with Smith College, by means of a main line through College avenue, as a result of the determination by the College to use gas for heating purposes in the laundry.

In our issue for September 5th brief mention was made of the death of Major Bennett, who had been a Director in the Freehold (N. J.) Gas Light Company since the date of its incorporation. That date, because of a "slip," was given as 1868, but the exact date was 1858. The error called forth a letter in correction, the tenor of which is sufficiently terse and good to warrant a reproduction of the same:

To the Editor of the American Gas Light Journal: How unkind to lop ten years off of our life! In 1868 we were and had been in business long enough to charge $5 per 1,000 for our product—the records state price, but not "character" of the product. Our age in '68 was twice the price. If you will promise not to do it again, you may never omit our name from list of cash subscribers.—Very truly yours, C. A. B., Jr.

The partially finished plant of the Standard Gas Light Company, of Huntington, Long Island, has been purchased by New York parties, who, it is claimed, will at once complete the works.

The Port Townsend (Wash.) City Council has been seized with the spirit of economy; but, if the wise men of the place will pardon us for the remark, we believe they commenced at the wrong end. Instead of cutting off a few officholders' heads—and the Port has quite a number that never would be missed—or reducing the salaries, by a fair percentage, of the entire crew—it was determined to cut off a certain number of public lamps and public hydrants. Plenty of artificial light on the streets, and a goodly number of hydrants as well, are the best sort of advertisement for a city that is anxious to attract additional residents, and to retain those already within the limits.

The new power plant of the Walla Walla (Wash.) Gas and Electric Company will be completed by December 1st, and Mr. Burrows is to be congratulated on having secured the aid of Mr. Coolman, of Spokane, who is attending to the engineering details.

"Observer" forwards the following account of the annual meeting of the Concord (N. H.) Gas Light Company: "The last annual meeting of the Concord Company was notable in that the shareholders were represented in greater force than at any other election in its history—1,569 shares were voted on. The Directors chosen were Messrs. John Kimball, J. B. Sanborn, Henry McFarland, F. A. Stillings, John P. George, L. D. Stevens and Benj. C. White. The Directors subsequently named Mr. John Kimball for President, and Mr. Sylvester Dana for Clerk. The Company's business is flourishing."

"R. D. T." informs us that the long-continued struggle for supremacy between the Citizens Gas Light Company, of Warsaw, N. Y., and the Warsaw Electric Light Company, has been compromised by a consolidation of interests. The joint capital is to be $50,000, and the plant of the Gas Company will be improved.

The Board of Park Commissioners of this city have wisely determined to light the approaches to the footwalks of the New York and Northern Railroad bridge over the Harlem by means of gas lamps. This should have been done five years ago.

THE BOSTON MEETING OF THE AMERICAN GAS LIGHT ASSOCIATION.

Secretary Slater's initial official circular respecting the 20th Annual Meeting of the American Association, to be held in Boston on the 19th, 20th and 21st days of next month, is given in full on pages 397-8 of this issue. From it one may at once perceive that the junior Slater is like the senior Slater, in that their systems of doing business are of the order methodical; in fact, if the circular is to be the type of his control of the routine business of the Secretary's desk, he can be said to have more than fulfilled the prophecies of those who named him for the post. Looking at the paper list only as to numbers, putting aside the probability of their interest, we are not sure that we agree with Mr. Slater as to the fewness thereof, for an even half dozen ought to permit of a good discussion on each. In the meantime, we are quite sure that at least one more paper, on an interesting subject, too, will be ready for Boston in due time.

The headquarters (the Parker House) and the meeting room (Pierce Hall) appear to be rather widely separated, but no one can gainsay that each for its particular purpose could not well be excelled. That a different arrangement could be satisfactorily made was not possible. The members who will be in attendance—and we hope they shall be at least 75 per cent. of the complete roll—should bear in mind the necessity of securing their quarters in advance, and all (those from a distance, at any rate), should note carefully the procedure to be observed in securing the one and one-third fare rate. It may be taken for granted that the outing time will be up to the standard. The time at which the circular was received precludes any extended reference in this issue, but a week from now we shall have more to say about the Boston muster.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

EDITOR—Jos. R. Thomas, C.E.
ASST. EDITOR—T. J. Cunningham.
MANAGER—C. E. Sanderson.

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No. 32 Pine Street, New York.

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VENTILATION, SANITARY IMPROVEMENT,
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TERMS:

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MONDAY, SEPTEMBER 19, 1892.

The Market for Gas Securities.

The market for city gas shares during the week was restricted and uncertain, Consolidated selling off on rather free offerings. Yesterday (Thursday) 670 shares of Consolidated were sold on the Exchange at the even figure of 115, but the opening to-day (Friday) was made at 115¼ to 116. Talk of a possible interference by the Legislature this winter in respect of gas rates in cities "of over 1,000,000 inhabitants" is already heard. Mutual moved up sharply to 145 bid, but holders ask 5 points more. Equitable shows no change. Standard also remains at the figures of a week ago, but holders should not be alarmed; the financial management of the Company at present is of the solid and conservative sort. Brooklyn stocks are remarkably strong all around, Nassau being bid for at 150. We note a sale at auction of 13 shares Williamsburgh at 132½. Chicago gas is weak at 78 to 78½, and Baltimore Consolidated declined to 58. These shares are cheap. Laclede is up and down, but the tone to it is down. Boston gas hangs fire at 56 to 56½, and is very dull. We might also remark that "plans" for the "plant of the proposed East River Gas Light Company" do not seem to suit the promoters thereof. They (the plans) may have to be revised.

Gas Stocks.

Quotations by Geo. W. Close, Broker and Dealer in Gas Stocks,

16 WALL ST., NEW YORK CITY.

SEPTEMBER 19.

☞ All communications will receive particular attention.
☞ The following quotations are based on the par value of $100 per share.

	Capital.	Par.	Bid	Asked
Consolidated	$35,430,000	100	115¾	116
Central	500,000	50	90	95
" Scrip	220,000	—	—	100
Equitable	4,000,000	100	153	155
" Bonds	1,000,000	—	106	108
Harlem, Bonds	170,000	—	—	—
Metropolitan, Bonds	658,000	—	110	115
Mutual	3,500,000	100	145	150
" Bonds	1,500,000	—	100	102
Municipal, Bonds	750,000		—	—
Northern		50	—	—
" Bonds	150,000	—	—	100
Standard Gas Co—				
Common Stock	5,000,000	100	35	—
Preferred	5,000,000	100	—	85
Yonkers		50	112	—
Richmond Co., S. I.	346,000	50	—	—
" Bonds	20,000	—	—	—
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	135	140
Citizens	1,200,000	20	113½	114
" S. F. Bonds	320,000	1000	—	103
Equity Gas Light Co.	2,000,000	100	—	—
Bonds	1,000,000	—	—	85
Fulton Municipal	3,000,000	100	138	140
" Bonds	300,000		102	—
Peoples	1,000,000	10	94	95
" Bonds (7's)	368,000	—	100	—
" " (6's)	94,000	—	100	—
Metropolitan	870,000	100	115	118
" Bonds (5's)	70,000	—	100	—
Nassau	1,000,000	25	150	—
" Ctfs	700,000	1000	99	100
Williamsburgh	1,000,000	50	130	—
" Bonds	1,000,000	—	107	110
Out of Town Gas Companies.				
Boston United Gas Co.—				
1s Series S.F. Trust	7,000,000	1000	87	88
2d " " "	3,000,000	1000	75	75½
Bay State Gas Co.—				
Stock	5,000,000	50	56	56½
Income Bonds	2,000,000	1000	77	78
Buffalo Mutual, N. Y.	750,000	100	110	—
" Bonds	200,000	1000	95	100
Citizens, Newark	1,000,000	50	155	160
Chicago Gas Company.	25,000,000	100	78	78¼
Chicago Gas Light & Coke Co.—				
G't'd Gold Bonds	7,650,000	1000	90½	90⅞
Equitable Gas & Fuel Co, Chicago, Bonds	2,000,000	1000	—	97½
People's Gas and Coke Co., Chicago—				
1st Mortgage	2,100,000	1000	102	—
2d "	2,500,000	1000	101½	—
Consumers Gas Light Co., Jersey City	2,000,000	100	20	—
Bonds	600,000	1000	80	—
Cincinnati G. & C. Co.	7,000,000	100	192	—
Consumers Toronto	1,600,000	50	190	191
Central, S. F., Cal			90	—
Capital, Sacramento, Cal			58	
Consolidated, Balt.	11,000,000	100	57	58½
" Bonds	6,400,000		107	107½

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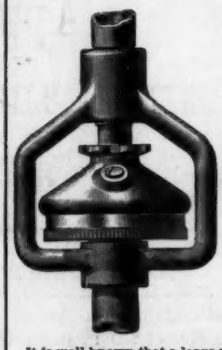

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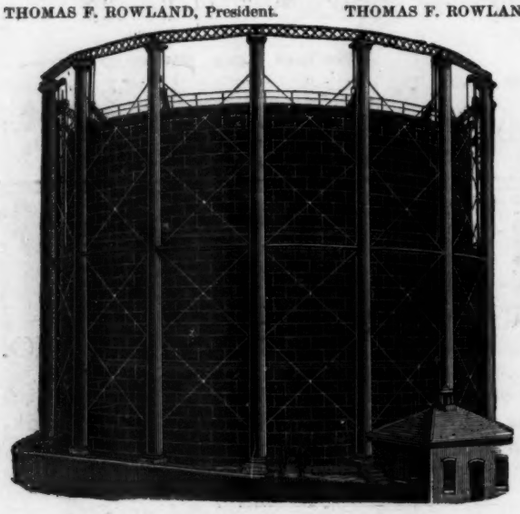

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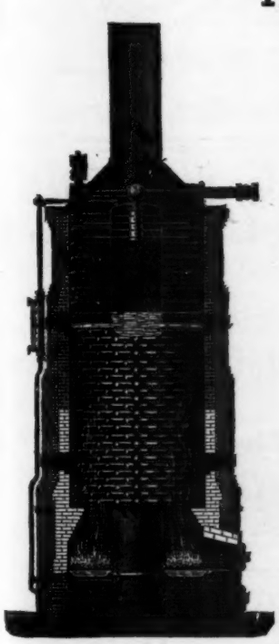

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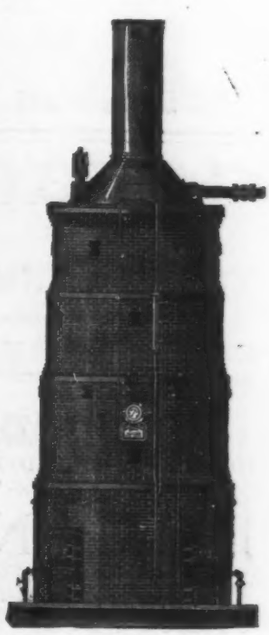

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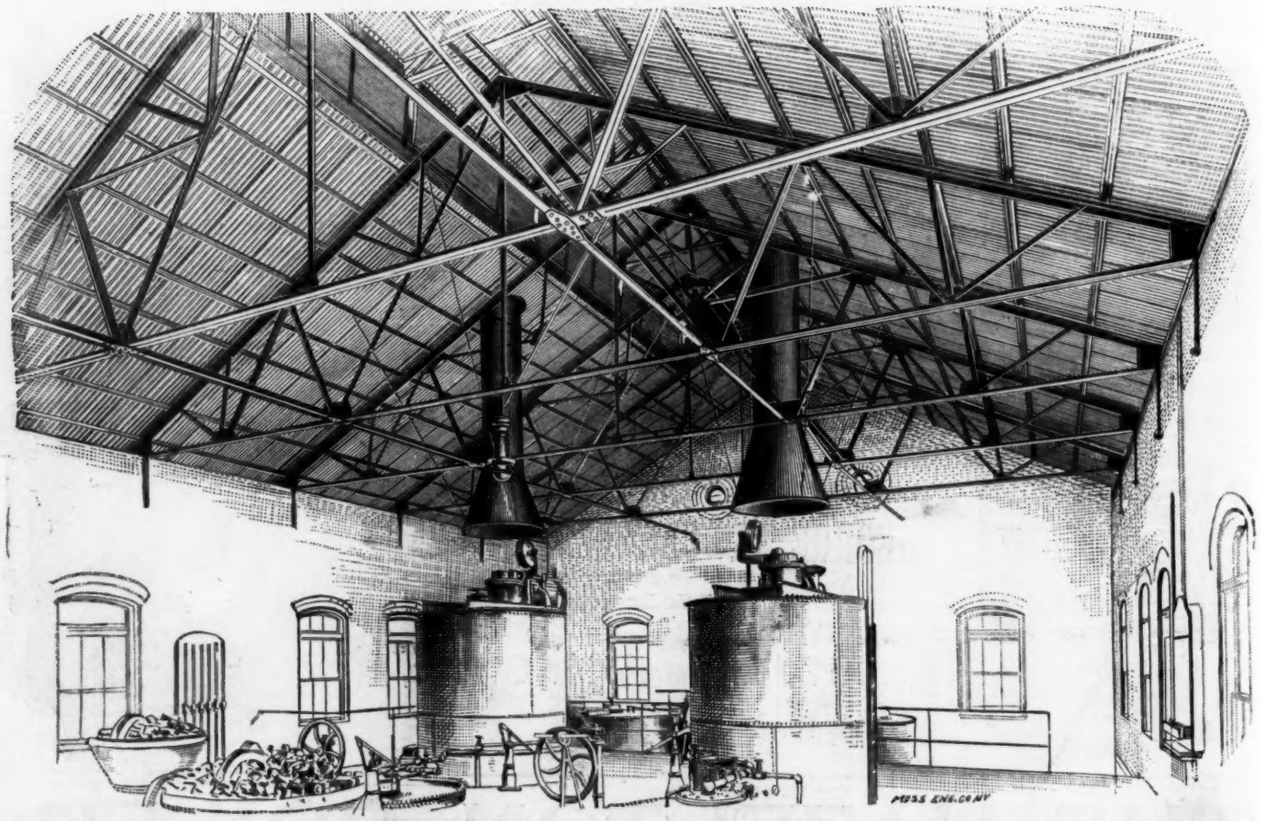

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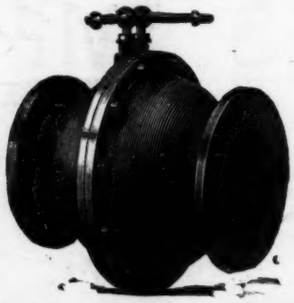

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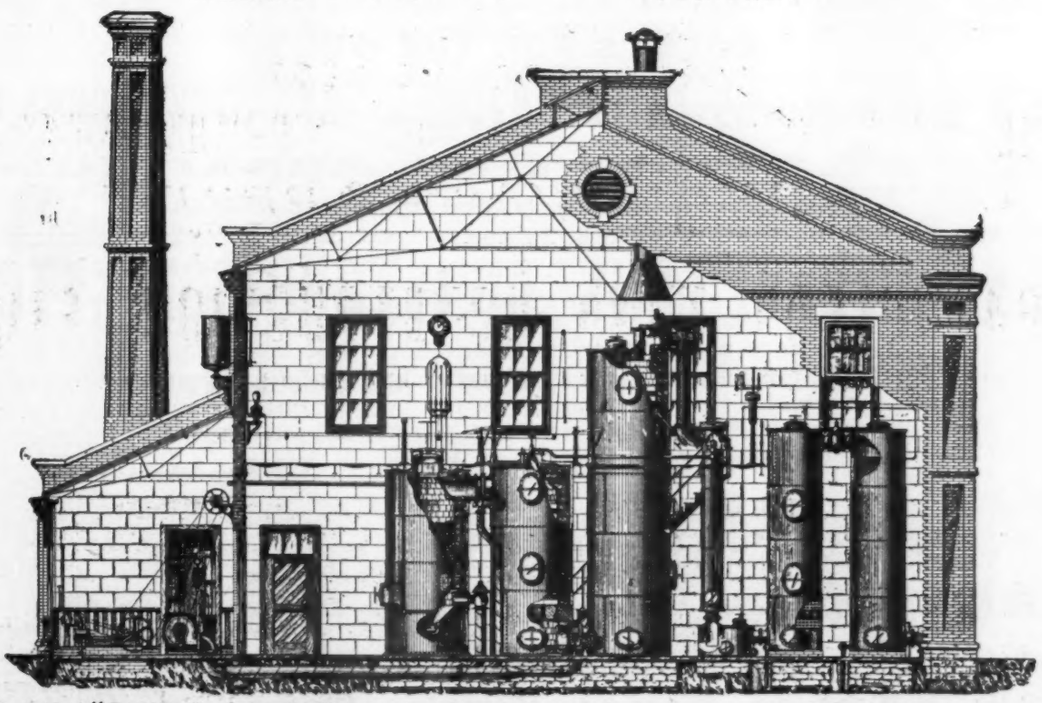

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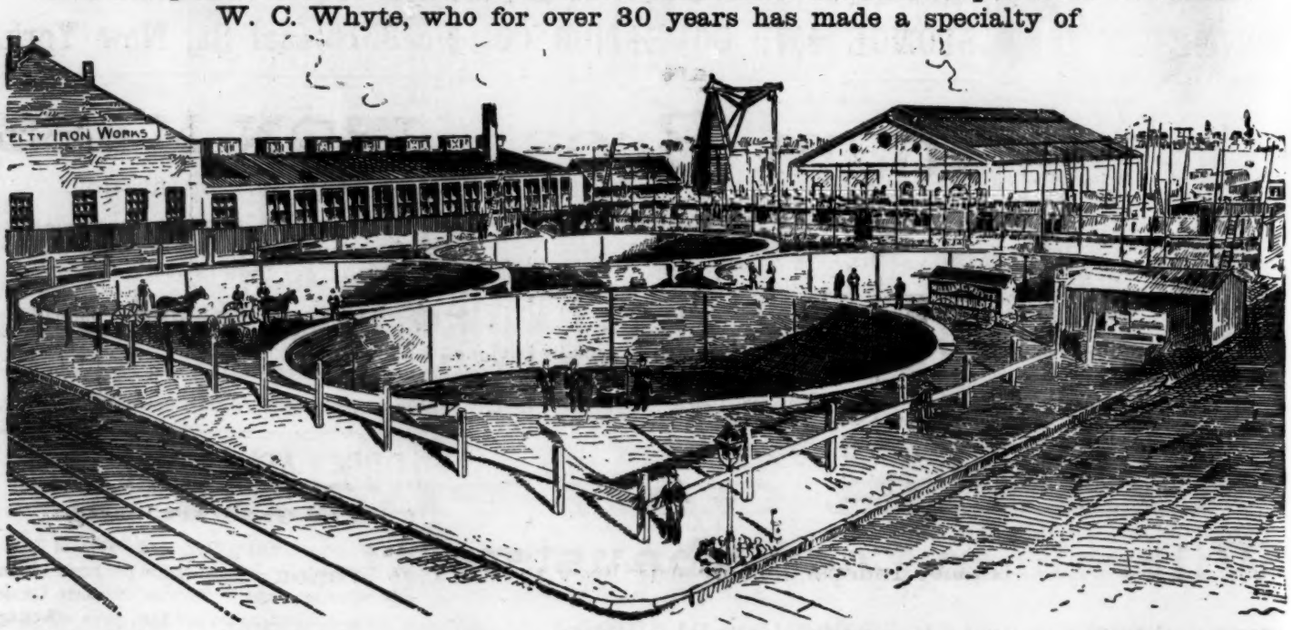

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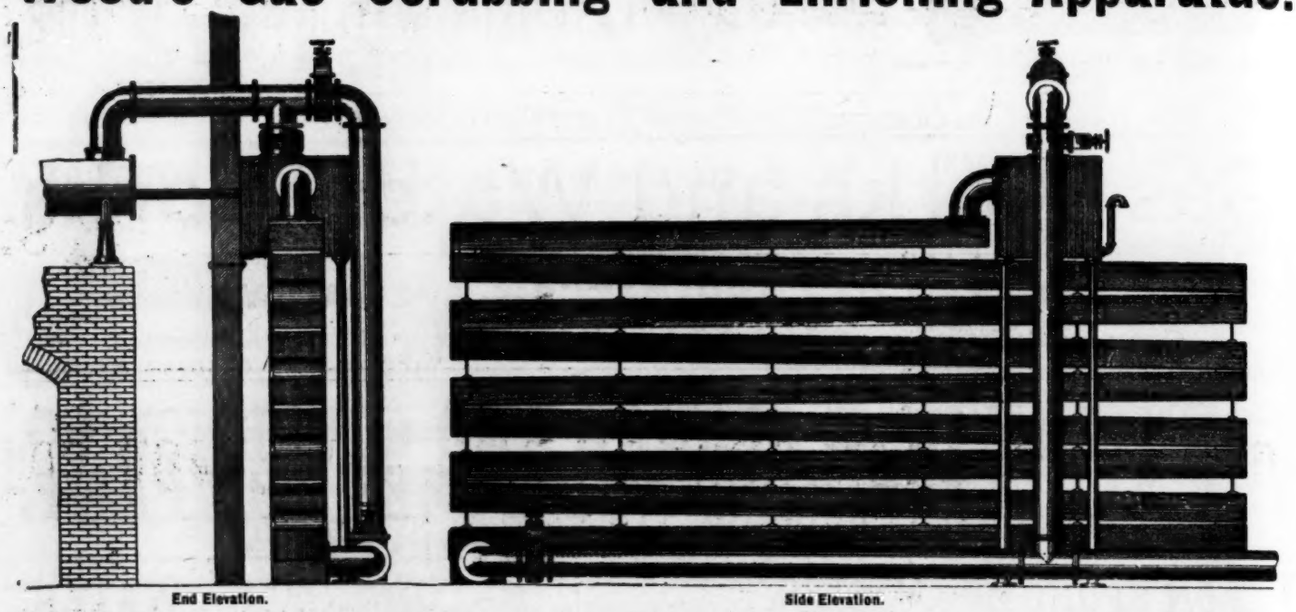

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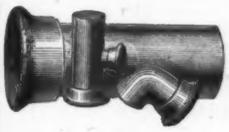

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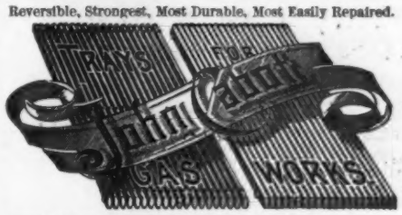

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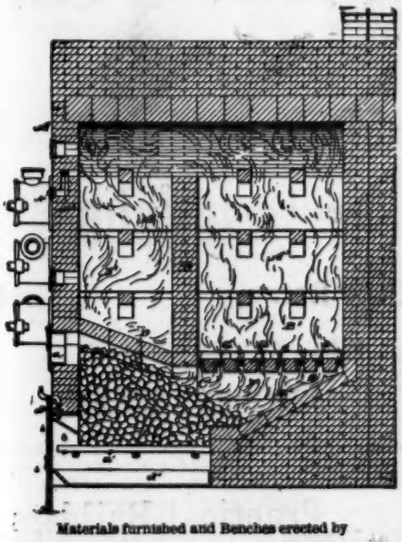

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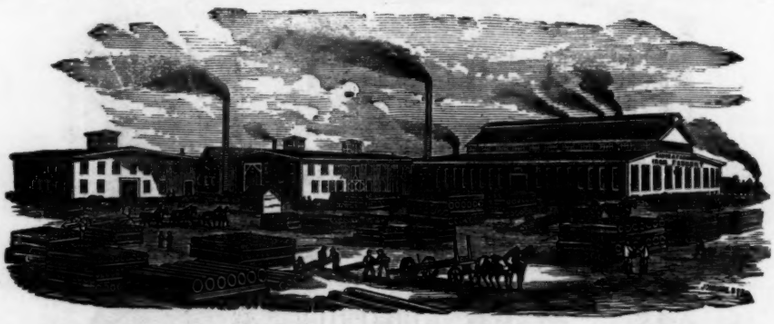

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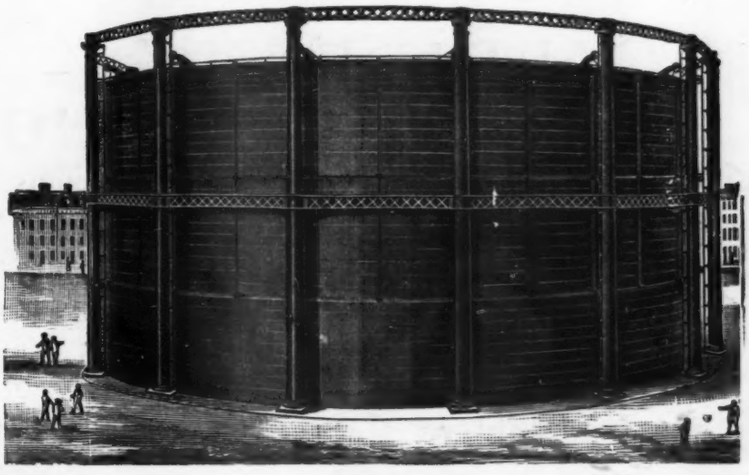

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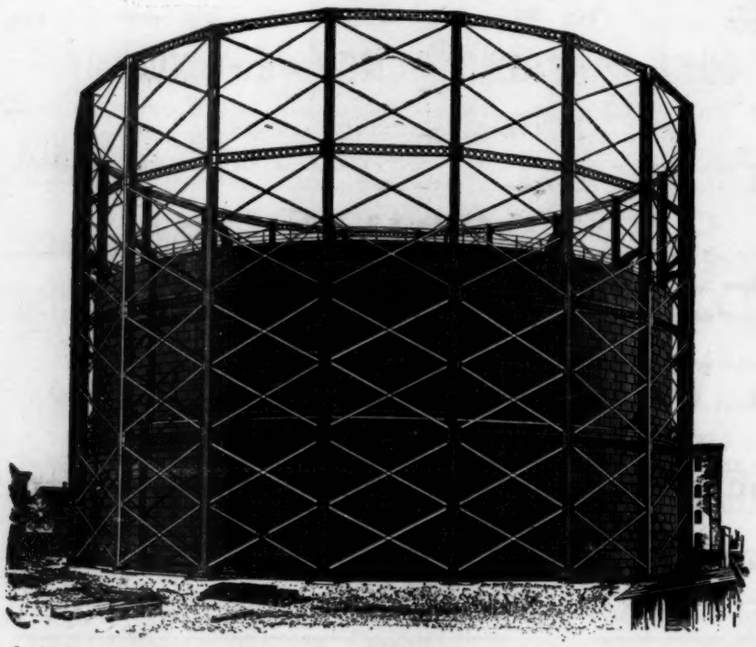

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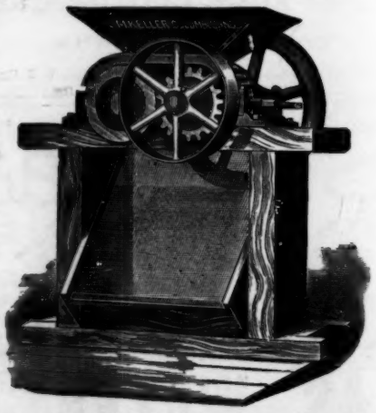

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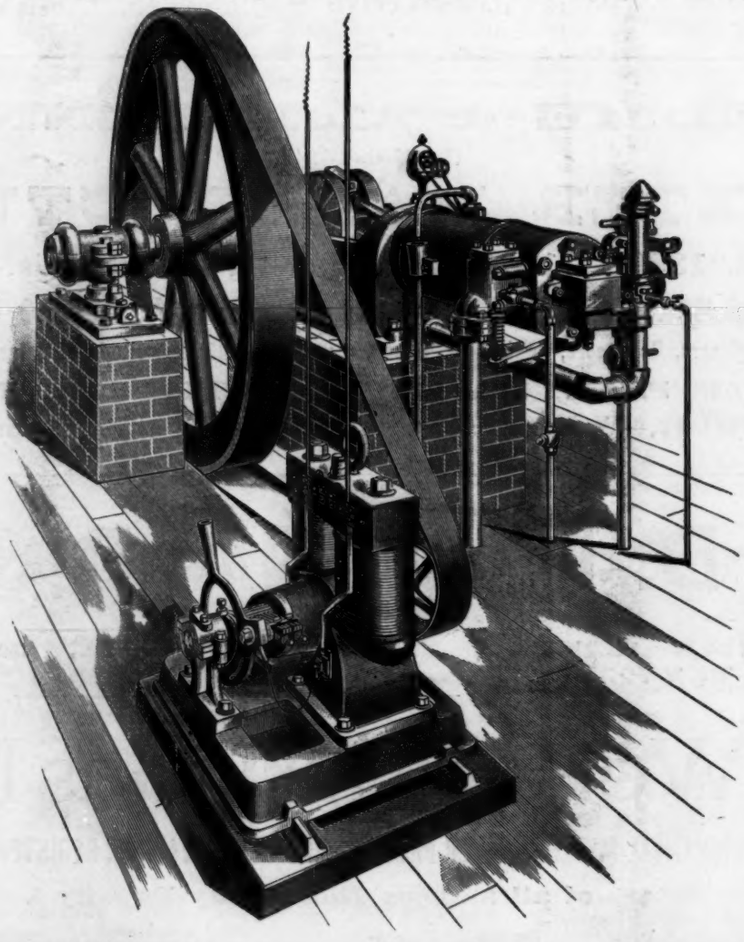

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